

UNIVERSITY OF WASHINGTON DEPARTMENT OF OCEANOGRAPHY

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Technical Report No. 134

PHYSICAL, CHEMICAL, AND BIOLOGICAL DATA
FROM THE NORTHEAST PACIFIC OCEAN:
COLUMBIA RIVER EFFLUENT AREA, JANUARY-JUNE 1963

Volume III

Brown Bear Cruise 322: 16 April - 1 May

Betty A Cruise 1: 9 - 11 May

Brown Bear Cruise 323: 13 - 19 May

Prepared by

C. M. LOVE

With the Data Analysis Staff

Scientific Program

Under the general direction of
Clifford A. Barnes

U.S. Atomic Energy Commission
Contract No. AT(45-1)-1725
RLO-1725-34

Office of Naval Research
Contracts Nonr-477(10)
and Nonr-477(37)
Project NR 083 012

Reference: May 1, 1967
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Reference M65-57
March 1966


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INTRODUCTION

This report constitutes Volume III of Technical Report No. 134 and contains data from Brown Bear Cruise 322, 16 April - 1 May 1963, Betty A Cruise 1, 9-11 May 1963, and Brown Bear Cruise 323, 13-19 May 1963. (A discussion of the objectives of these cruises and the scientific program of which they were a part will be found in Volume I, together with descriptions of the observations made, the methods of collecting samples and the methods of determination of properties, A list of the personnel engaged in collecting and preparing the data and a bibliography will also be found in Volume I.

The Betty A is a fishing vessel based in Westport, Washington. It was chartered by the Department of Oceanography to make a short cruise for the purpose of collecting phytoplankton productivity data. (See Volume I)

The cruise tracks and station locations for cruises Brown Bear 322, Betty A-1, and Brown Bear 323 will be found in Figures 1, 2, and 3 of this volume.

The values of phosphate, silicate, and nitrate reported for cruises 322 and 323 were obtained from the analysis of samples which were frozen aboard ship immediately after collection and returned to Seattle for later analysis ashore. Biological data only were obtained on the Betty A Cruise.

EXPLANATION OF DATA TABLES

The information in the data tables was transcribed directly from IBM cards using an IBM 1401 Data Processing System. A blank space in the tables or headings indicates that no observation was taken. The original data and the interpolated and computed values punched on the cards are in most cases recorded or coded in accordance with the procedures used by the National Oceanographic Data Center; however, some weather information is coded with U.S. Navy Hydrographic Office codes. The codes used to describe weather and sea conditions, etc., will be found in NODC Publication M-2 (National Oceanographic Data Center, 1964) or in H.O. Publication No. 606-c (U.S. Navy Hydrographic Office, 1956) and H.O. Publication No. 607 (U.S. Navy Hydrographic Office, 1955a). (See References in Volume I.) Some changes were made in the card format, but these do not affect the arrangement of the data in this report. Abbreviations and column headings are described below and, where necessary, the NODC or Hydrographic Office numerical codes have been reproduced to aid in interpreting the data.

Abbreviations and Headings Used in Data Tables

DATE	For Observed Values the date given is Greenwich day/month/year. For Biological Data the date given is local (ship's time, +8 zone) day/month/year.
HR (Hour)	Greenwich mean time to the nearest tenth of an hour of the messenger drop on the first cast.
LAT (Latitude and LONG (Longitude)	In degrees and minutes; or in degrees, minutes, and tenths of minutes on some stations.
SNDG (Depth of water)	Depth of water in meters at the station as determined by the ship's echo sounder. This depth was generally recorded immediately after the ship arrived on station.
WEA (Weather)	State of the weather. One of two possible codes was used for reporting present weather. A two-digit number in this space indicates use of WMO Code 4677, shown on page 10; one number preceded by an X indicates use of WMO Code 4501, shown on page 11. The X has no significance except to indicate which code was used.
WIND VEL DIR (Wind velocity and direction)	Wind velocity in knots. Wind direction, see code, page 8.
BAROM (Barometric pressure)	To obtain the barometric pressure in millibars, add 900 if this number is above 50; add 1000 if below 50.
TEMP DRY WET (Air temperature, dry, wet bulb)	In degrees Celsius.
RELHU (Relative Humidity)	Expressed in per cent.
WTRCLR (Water color)	Expressed according to the Forel-Ule scale. See code, page 9.
SECDI (Water transparency)	Depth in meters to which a 12-inch (30.5 cm) Secchi disk could be seen on daylight stations.

SEA <u> </u> DIR <u> </u> (Sea state and direction)	State of the sea, see code, page 8 . Direction from which sea was coming, see code, page 8 .
SWELL <u> </u> DIR <u> </u> (Swell amount and direction)	Height and wave length of swell, see code, page 9 . Direction from which swell was coming, see code, page 8 .
DOM WAVE DIR <u> </u> HT <u> </u> PER <u> </u> (Dominant wave direc- tion, height, and period)	Dominant wave characteristics (National Oceanographic Data Center, 1964) were re- ported on some cruises instead of sea and swell. Direction from which waves were coming, see code, page 8 . Height of waves, see code, page 11. Period of waves, see code, page 11.
CLOUD TYPE <u> </u> AMT <u> </u> (Cloud type and amount)	Cloud type, see code, page 7 . Amount of cloud cover, see code, page 7 .
VIS (Visibility)	Range of visibility. See code, page 8 .
WIRE ANGLE(S)	In degrees. Wire angles are tabulated only for those casts whose numbers appear in the "Cast" column at the left of the page, i.e., casts from which data were obtained. The first number is the wire angle for Cast 1, or the lowest numbered cast appearing, the second for Cast 2, etc. Dashes (- -) indi- cate the wire angle was not recorded for that cast.
CST (Cast)	Cast number.
DEPTH	Depth in meters from which sample was obtained.
TEMP (Temperature)	In degrees Celsius.
SAL (Salinity)	In parts per thousand (°/oo).
SIGMA-T (σ_t)	An expression for the density of sea water at atmospheric pressure, having the indi- cated temperature and salinity. To convert sigma-t values to density, divide by 1000 and add 1; thus sigma-t 22.42 = density 1.02242.
OXYGEN (Dissolved Oxygen)	
ML/L	In milliliters per liter
MGA/L	In milligram-atoms per liter

AOU (Apparent oxygen utilization)	In milligram-atoms per liter.
SATN (Saturation)	Per cent of oxygen saturation.
PHOS (Phosphate-phosphorus)	In microgram-atoms per liter ($\mu\text{g-at/l}$).
NITR (Nitrate-nitrogen)	In microgram-atoms per liter ($\mu\text{g-at/l}$).
SIL (Silicate-silicon)	In microgram-atoms per liter ($\mu\text{g-at/l}$).
CHL-A (Chlorophyll <u>a</u>)	In milligrams per cubic meter.
PRODUCTIVITY, LAB-I (Incubator productivity)	Expressed as milligrams carbon assimilated per cubic meter per hour.
PRODUCTIVITY, DECK-I (Simulated <u>in situ</u> productivity)	Expressed as milligrams carbon assimilated per cubic meter per day.
LIGHT SAT	Data from light saturation experiments. Refer to text, page 6 of Volume I.
PROD (Productivity)	Productivity of sample receiving the indicated amount of illumination. Expressed as milligrams of carbon assimilated per cubic meter per hour.
FILT (Filter)	Indicates the per cent of total incubator illumination transmitted to the sample through a neutral density filter. The total incubator illumination in units of lux is listed at the bottom of the Biological Data section.
IRRAD (Irradiance)	Per cent of surface solar radiation reaching the indicated depth.
OXY (Dissolved oxygen)	Units are indicated in the column heading. In the Biological Data section oxygen is reported in milligram-atoms per liter. In the Interpolated and Computed Values oxygen is reported in milliliters per liter.
WATER COLUMN VALUES	Integrated values over the water column from the surface to the bottom of the euphotic zone for CHL-A, LAB-I, and DECK-I. The values at 100 meters and below are not included in this integration because they are below the euphotic zone.

MESSENGER TIME

Messenger time (ship's time, +8 zone) of the productivity cast.

INCOMING SOLAR
RADIATION - AM _____
PM _____

Expressed in calories per square centimeter. The AM value is the integrated value of incoming radiation from sunrise to ship's noon; PM represents from ship's noon to sunset.

ZOOPLANKTON

Indicates that zooplankton samples were collected at this station. The information following indicates the type of sampler or net used, the type of tow made, the times of the tow, and the depths sampled, as follows:

(CLARKE-BUMPUS)

Clarke-Bumpus sampler

(HALF-METER NET)

Half-meter net

(MIDWATER TRAWL)

Midwater trawl

HORIZ

Horizontal tow

VERT

Vertical tow

OBL

Oblique tow

STEP

Stepped tow

TIME (from - to)

Ship's time (+8 zone) of the tow

DEPTHS

Depths sampled

Example: Station 318-6

ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0154-0204 DEPTHS 100, 70
0232-0243 30, 0

means that two horizontal tows using Clarke-Bumpus were made. The first tow began at 0154 ship's time, lasted until 0204 and sampled at 70 and 100 meters (two samplers on the wire). The second tow sampled at the surface and 30 meters and lasted from 0232 to 0243 ship's time.

LIGHT SATURATION
INCUBATOR ILLU-
MINATION

Total incubator illumination for light saturation experiments. Expressed in lux.

SP VOL ANOMALY
(Specific volume
anomaly, 10^{-5})

The anomaly of specific volume at the indicated temperature, salinity, and pressure compared to a standard water of 0°C temperature and 35 ‰ salinity, at the same pressure. Tabular values multiplied by 10^{-5} will give the anomaly in units of cubic centimeters per gram.

GEO POT ANOMALY (Geopotential anomaly, EAD)

Geopotential anomaly in dynamic meters of the layer of water between the surface and the indicated depth.

POT ENERGY (Potential energy anomaly)

Potential energy anomaly in units of 10^8 ergs per square centimeter of the layer of water between the surface and the indicated depth.

VAR RATIO (Variance ratio)

The ratio of the variance of the interpolation polynomial to the variance of the measurement. The value of the variance ratio is an indication of the adequacy of the vertical spacing of the observed values upon which the interpolation is based. See page 7 of Volume I. Values close to 1 indicate optimum spacing. Values greater than 3 indicate that the vertical spacing is inadequate to represent faithfully the distribution of properties in this region of the curve. In the case of missing values, where different combinations of observed values may be used to interpolate at the same depth, the variance ratio which indicates the worst spacing has been printed. Values greater than 100 have been printed as 99.99. If the observed depth corresponds to a desired standard depth, no interpolation is made and the variance ratio is not computed.

E(T) (Temperature interpolation error)

Interpolation error, in degrees Celsius, of the temperature value at this depth. For a discussion of the interpolation error, see page 7 of Volume I. If the observed depth corresponds to a desired standard depth, the interpolation error will be zero.

E(S) (Salinity interpolation error)

Interpolation error, in parts per thousand, of the salinity value at this depth. See comments under E(T) above.

E(O) (Oxygen interpolation error)

Interpolation error, in milliliters per liter, of the oxygen value at this depth. See comments under E(T) above.

*

Indicates a questionable value. See page 8 of Volume I.

†

Indicates a hand-interpolated value. See page 8 of Volume I.

Codes Used for Reporting Observations

Taken from National Oceanographic Data Center Publication M-2, "Processing Physical and Chemical Data from Oceanographic Stations," or U.S. Navy Hydrographic Office Publication No. 606-c, "Hydrographic Office Observers Manual. Bathythermograph Observations," or U.S. Navy Hydrographic Office Publication No. 607, "Instruction Manual for Oceanographic Observations."

Cloud Type (taken from NODC Publication M-2) WMO Code 0500

Code

0	Cirrus	Ci
1	Cirrocumulus	Ce
2	Cirrostratus	Cs
3	Alto cumulus	Ac
4	Altostratus	As
5	Nimbostratus	Ns
6	Stratocumulus	Sc
7	Stratus	St
8	Cumulus	Cu
9	Cumulonimbus	Cb
x	Cloud not visible owing to darkness, fog, duststorm, sandstorm, or other analogous phenomena	

Amount of Cloud Cover (taken from NODC Publication M-2) WMO Code 2700

Code

0	0	0
1	1 okta or less, but not zero	1/10 or less, but not zero
2	2 oktas	2/10 - 3/10
3	3 oktas	4/10
4	4 oktas	5/10
5	5 oktas	6/10
6	6 oktas	7/10 - 8/10
7	7 oktas or more, but not 8 oktas	9/10 or more, but not 10/10
8	8 oktas	10/10
9	Sky obscured, or cloud amount cannot be estimated	

Visibility (taken from NODC Publication M-2) WMO Code 4300

Code

0	Less than 50 metres	(less than 55 yards)
1	50-200 metres	(approx. 55-220 yards)
2	200-500 metres	(approx. 220-550 yards)
3	500-1,000 metres	(approx. 550 yards-5/8 n.m.)
4	1- 2 km	(approx. 5/8-1 n.m.)
5	2- 4 km	(approx. 1- 2 n.m.)
6	4-10 km	(approx. 2- 6 n.m.)
7	10-20 km	(approx. 6-12 n.m.)
8	20-50 km	(approx. 12-30 n.m.)
9	50 km or more	(30 n.m. or more)

Direction (taken from NODC Publication M-2)

Compass Direction from which Wind, Sea, or Swell is coming

Code

00	Calm, or no value
01 to 36	Each value represents 1/10 of the true direction in degrees, measured clockwise from the north, with 36 representing true north.

State of the Sea - Wind Waves (taken from NODC Publication M-2)

WMO Code 3700

Code	Description	Height (Feet)
0	Calm (Glassy)	0
1	Calm (Rippled)	0 - 1/3
2	Smooth (Wavelets)	1/3 - 1 2/3
3	Slight	1 2/3 - 4
4	Moderate	4 - 8
5	Rough	8 - 13
6	Very Rough	13 - 20
7	High	20 - 30
8	Very High	30 - 45
9	Phenomenal	over 45

Swell Conditions (taken from H.O. 606-c or H.O. 607)

Code	Approx. Height in Feet	Description		Approx. Length in Feet
0	0	No swell		0
1 2	1 - 6	Low swell	Short or average Long	0 - 600 Above 600
3 4 5	6 - 12	Moderate	Short Average Long	0 - 300 300 - 600 Above 600
6 7 8	Greater than 12	High	Short Average Long	0 - 300 300 - 600 Above 600
9	---	Confused		

Water Color (taken from NODC Publication M-2)

Forel-Ule scale and conversions from per cent yellow and
per cent brown scales

Per Cent Yellow	Per Cent Brown	Forel-Ule Scale	Code
0		I	01
2		II	02
5		III	03
9		IV	04
14		V	05
20		VI	06
27		VII	07
35		VIII	08
44		IX	09
54		X	10
65	0	XI	11
	2	XII	12
	5	XIII	13
	9	XIV	14
	14	XV	15
	20	XVI	16
	27	XVII	17
	35	XVIII	18
	44	XIX	19
	54	XX	20
	65	XXI	21

NUMERICAL WEATHER CODES—PRESENT WEATHER

[illegible]

This code will be found in NODC Publ. M-2. WMO Code 4677

Height of Dominant Waves (taken from NODC Publication M-2) WMO Code 1555

Code		Code	If 50 is added to direction
0	Less than 1/4 m (1 ft)	0	5 m (16 ft)
1	1/2 m (1 1/2 ft)	1	5 1/2 m (17 1/2 ft)
2	1 m (3 ft)	2	6 m (19 ft)
3	1 1/2 m (5 ft)	3	6 1/2 m (21 ft)
4	2 m (6 1/2 ft)	4	7 m (22 1/2 ft)
5	2 1/2 m (8 ft)	5	7 1/2 m (24 ft)
6	3 m (9 1/2 ft)	6	8 m (25 1/2 ft)
7	3 1/2 m (11 ft)	7	8 1/2 m (27 ft)
8	4 m (13 ft)	8	9 m (29 ft)
9	4 1/2 m (14 ft)	9	9 1/2 m (30 1/2 ft)
x	Height not determined		

Period of Dominant Waves (taken from NODC Publication M-2) WMO Code 3155

Code		Code	
2	5 seconds or less	8	16 or 17 seconds
3	6 or 7 seconds	9	18 or 19 seconds
4	8 or 9 seconds	0	20 or 21 seconds
5	10 or 11 seconds	1	Over 21 seconds
6	12 or 13 seconds	x	Calm, or period not determined
7	14 or 15 seconds		

Present Weather (taken from NODC Publication M-2) WMO Code 4501

Code
figure

- 0 Clear (no cloud at any level)
- 1 Partly cloudy (scattered or broken)
- 2 Continuous layer(s) or cloud(s)
- 3 Sandstorm, duststorm, or blowing snow
- 4 Fog, thick dust or haze
- 5 Drizzle
- 6 Rain
- 7 Snow, or rain and snow mixed
- 8 Shower(s)
- 9 Thunderstorm(s)

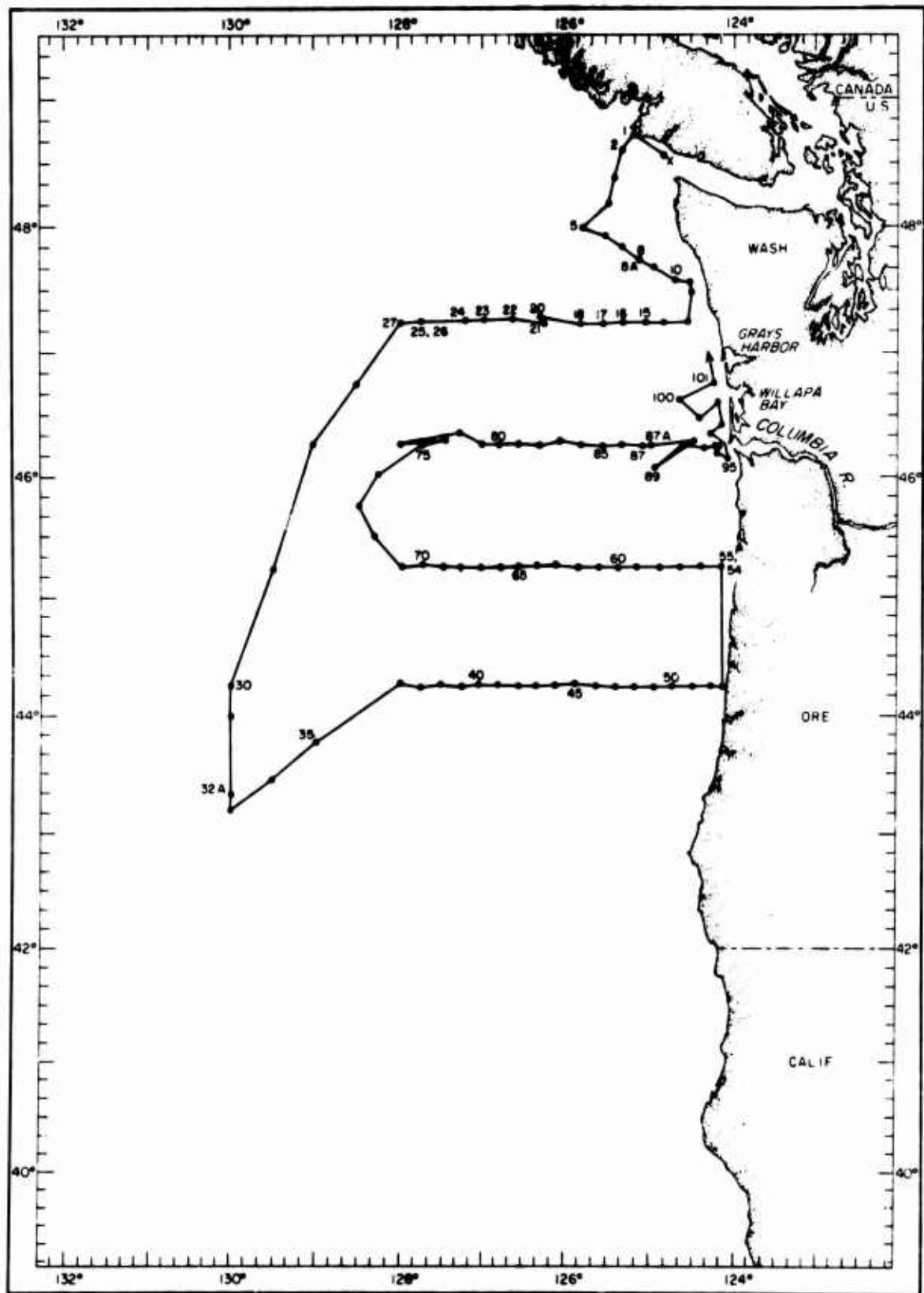


Fig. 1. Station locations Brown Bear Cruise 322, 16 April - 1 May 1963.

BROWN BEAR CRUISE 322 STATION 00X BIOLOGICAL DATA

STRAIT OF JUAN DE FUCA ENTRANCE

DATE 17/04/63 LAT 48-32 N LONG 124-50 W

DEPTH CHL-A PRODUCTIVITY LAB-I DECK-I SAL

0 0.41 2.02 16.26 28.122

MESSENGER TIME 0507 INCOMING SOLAR RADIATION - AM 217 PM 174

BROWN BEAR CRUISE 322 STATION 001 OBSERVED VALUES

CLO-00SE

DATE 17/04/63 HR 16.3 LAT 48-42 N LONG 125-11 W SNGD 70 WEA 02 WIND VEL 0 DIR 00
 BAROM 15.0 TEMP DRY 12.0 WET 8.9 RELHU 64 WTRCLR SECDI 13 SEA 1 DIR 07 SWELL 1 DIR 29
 CLOUD TYPE 8 AMT 5 VIS 8 WIRE ANGLE(S) 10

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
1	0	10.07	28.924	22.17	6.42	0.573	-0.001	100	
1	5	10.12	29.202	22.44	6.38	0.570	-0.002	100	
1	10	9.96	30.132	23.19	6.17	0.551	0.015	97	
1	20	9.87	30.660	23.61	6.09	0.544	0.021	96	
1	29		30.968		6.07	0.542			96
1	39	9.27	31.378	24.27	6.15	0.549	0.021		96
1	49	8.63	31.464	24.43	6.24	0.557	0.021		96

BROWN BEAR CRUISE 322 STATION 001 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-1	DECK-1	SAL
0	0.37	1.16		28.970
5	0.33	1.21		28.948
18	0.47	0.91		30.815
35	0.34	0.65		31.188
50	0.29	0.52		31.461

13.84 32.95 - WATER COLUMN VALUES

MESSENGER TIME 0835 INCOMING SOLAR RADIATION - AM 217 PM 174

BROWN BEAR CRUISE 322 STATION 001				INTERPOLATED AND COMPUTED VALUES							
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.07	0.00	28.924	0.000	22.23	560.8	0.000	0.00	6.42	0.00	
10	9.96	0.00	30.132	0.000	23.19	469.5	0.032	0.02	6.17	0.00	
20	9.87	0.00	30.660	0.000	23.41	429.1	0.098	0.09	6.09	0.00	
30	9.64	0.01	31.015	0.006	23.93	399.4	0.139	0.20	6.08	0.00	0.91

BROWN BEAR CRUISE 322 STATION 002 OBSERVED VALUES

CARMANAH POINT

DATE 17/04/63 HR 18.4 LAT 48-35 N LONG 125-20 W SNGD 119 WEA 02 WIND VEL 2 DIR 20
 BAROM 14.0 TEMP DRY 10.6 WET 8.6 RELHU 81 WTRCLR SECDI 17 SEA 1 DIR 20 SWELL 1 DIR 24
 CLOUD TYPE 8 AMT 5 VIS 8 WIRE ANGLE(S) 5

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
1	0	9.89	31.054	23.92	6.28	0.561	-0.003	100	0.57	1.1	11
1	5	9.79	31.690	24.43	6.16	0.550	0.012	98	0.69	1.6	9
1	10	9.65	31.834	24.56	6.15	0.549	0.014	97	0.73	1.8	8
1	20	9.61	31.994	24.69	6.07	0.542	0.021	96	0.72	2.3	9
1	30		32.014		6.05	0.540			0.73	2.4	8
1	39	9.36	32.078	24.80	5.98	0.534	0.033	94	0.84	3.2	10
1	49	9.42	32.192	24.88	5.80	0.518	0.047	92	0.92	4.3	12

BROWN BEAR CRUISE 322 STATION 002 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY	LAB-I	DECK-I	LIGHT	SAT	IRRAD	SAL	PHOS	NITR	SIL
0	0.34	0.84	7.46		0.75	100		30.996	0.62	1.5	11
					0.68	66					
					0.60	50					
					0.55	35					
					0.27	16					
					0.14	5					
5	0.35	0.83	5.00				50	31.297	0.68	1.5	9
15	0.29	0.40	0.38				10	31.824	0.72	2.0	7
33	0.23	0.21	0.00				1	32.027	0.77	2.4	7
100	0.19	0.14						32.699	1.66	18.2	28

9.56 15.82 61.68 - WATER COLUMN VALUES

MESSANGER TIME 1210 INCOMING SOLAR RADIATION - AM 217 PM 174

LIGHT SATURATION INCUBATOR ILLUMINATION 19300

BROWN BEAR		CRUISE 322		STATION 002		INTERPOLATED AND COMPUTED VALUES					
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.89	0.00	31.054	0.000	23.92	399.9	0.000	0.00	6.28	0.00	
10	9.65	0.00	31.834	0.000	24.56	338.5	0.038	0.02	6.15	0.00	
20	9.61	0.00	31.994	0.000	24.69	326.2	0.071	0.07	6.07	0.00	
30	9.46	0.03	32.014	0.000	24.73	322.6	0.104	0.15	6.05	0.00	0.91

BROWN BEAR		CRUISE 322		STATION 003		OBSERVED VALUES					
DATE	17/04/63	HR	22.4	LAT	48-22 N	LONG	125-26 W	SNDC	128	WEA	SEA
BAROM	15.0	TEMP	DRY	10.6	WET	8.3	RELHU	75	WTRCLR		
CLOUD	TYPE	AMT	VIS	WIRE	ANGLE(S)	5					
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	AOU	SATN			
1	0	10.17	30.848	23.71	8.86	0.791	-0.231	141			
1	5	9.87	30.944	23.83	7.36	0.657	-0.093	117			
1	10	9.90	31.470	24.24	7.10	0.634	-0.072	113			
1	20	9.72	31.910	24.61	8.00	0.715	-0.152	127			
1	30		32.056		8.10	0.723					
1	49	9.32	32.210	24.91	8.15	0.728	-0.162	129			
1	74	8.83	32.754	25.41	4.05	0.362	0.209	63			
1	99	8.12	33.182	25.85	4.92	0.439	0.139	76			

WIND VEL 10 DIR 31
DIR 31 SWELL DIR 24

BROWN BEAR			CRUISE 322			STATION 003			INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO		
0	10.17	0.00	30.848	0.000	23.71	419.5	0.000	0.00	8.86	0.00			
10	9.90	0.00	31.470	0.000	24.24	369.3	0.040	0.02	7.10	0.00			
20	9.72	0.00	31.910	0.000	24.61	334.1	0.076	0.07	8.00	0.00			
30	9.58	0.01	32.056	0.000	24.75	321.3	0.109	0.16	8.10	0.00	1.07		
50	9.30	0.00	32.229	0.003	24.93	304.6	0.172	0.41	7.98	0.06	0.95		
75	8.81	0.00	32.777	0.001	25.43	256.9	0.242	0.86	3.92	0.02	7.36		

BROWN BEAR CRUISE 322 STATION 004 OBSERVED VALUES													
DATE 17/04/63 HR 00.3 LAT 48-10 N LONG 125-30 W SNDG 140 WEA 02 WIND VEL 9 DIR 20													
BAROM 12.0 TEMP DRY 10.0 WET 8.0 RELHU 74 WTRCLR SEA 1 DIR 20 SWELL 1 DIR 24													
CLOUD TYPE 8 AMT 6 VIS 7 WIRE ANGLE(S) 8													
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN				
1	0	10.00	31.189	24.00	6.31	0.564	-0.002	100	100				
1	5	9.96	31.218	24.03	6.33	0.565	-0.003	101	101				
1	10	9.45	31.917	24.66	6.43	0.574	-0.009	102	102				
1	20	9.43	31.954	24.69	6.38	0.570	-0.004	101	101				
1	30	9.43	32.042	24.76	6.33	0.565	0.000	100	100				
1	49	9.27	32.252	24.95	6.14	0.548	0.018	97	97				
1	74	8.83	32.617	25.30	5.29	0.472	0.099	83	83				
1	99	8.36	33.230	25.85	3.79	0.338	0.236	59	59				
1	130	7.76	33.512	26.16	3.06	0.273	0.308	47	47				

BROWN BEAR		CRUISE 322		STATION 004		INTERPOLATED AND COMPUTED VALUES					
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.00	0.00	31.189	0.000	24.00	391.6	0.000	0.00	6.31	0.00	
10	9.45	0.00	31.917	0.000	24.66	329.3	0.037	0.02	6.43	0.00	
20	9.43	0.00	31.954	0.000	24.69	326.4	0.070	0.07	6.38	0.00	
30	9.43	0.00	32.042	0.000	24.76	320.0	0.102	0.15	6.33	0.00	
50	9.26	0.00	32.263	0.001	24.96	301.3	0.165	0.41	6.12	0.00	0.95
75	8.81	0.00	32.642	0.004	25.33	267.0	0.237	0.86	5.23	0.01	0.94
100	8.34	0.00	33.252	0.002	25.87	215.3	0.297	1.40	3.74	0.00	5.28

BROWN BEAR CRUISE 322 STATION 005 OBSERVED VALUES

DATE 18/04/63 HR 03.6 LAT 47-59 N LONG 125-48 W SNRG 875 WEA 03 WIND VEL 17 DIR 28
 BAROM 12.0 TEMP DRY 9.4 WET 7.8 RELHU 80 WTRCLR SEA 3 DIR 28 SWELL 1 DIR 30
 CLOUD TYPE 8 AMT 7 VIS 7 WIRE ANGLE(S) 12.12

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN		SATN
					ML/L	MGA/L	
2	0	9.58	32.146	24.82	6.37	0.569	101
2	5	9.57	32.152	24.82	6.31	0.564	100
2	10	9.61	32.154	24.82	6.20	0.554	98
2	20	9.62	32.152	24.82	6.22	0.556	99
2	30	9.55	32.166	24.84	6.18	0.552	98
2	50	9.26	32.324	25.01	6.15	0.549	97
2	75	8.84	32.750	25.40	5.12	0.457	80
2	100	8.05	33.323	25.97	4.10	0.366	63
2	125	7.80	33.643	26.26	3.40	0.304	52
2	150	7.65	33.838	26.43	2.79	0.249	43
2	175	7.45	33.918	26.53	2.50	0.223	38
1	290	6.23	34.004	26.76	1.85	0.165	27
1	387	5.67	34.039	26.86	1.34	0.120	20
1	580	4.71	34.176	27.08	0.62	0.055	9
1	773	4.13	34.313	27.25	0.26	0.023	4

BROWN BEAR CRUISE 322 STATION 005 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.48	0.55		32.148
5	0.62	0.60		32.148
15	0.57	0.49		32.141
33	0.73	0.44		32.176
100	0.04	0.00		33.340

20.44 16.74 - WATER COLUMN VALUES

MESSANGER TIME 2003 INCOMING SOLAR RADIATION - AM 217 PM 174

BROWN BEAR			CRUISE 322		STATION 005		INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.58	0.00	32.146	0.000	24.82	314.1	0.000	0.00	6.37	0.00	
10	9.61	0.00	32.154	0.000	24.82	314.1	0.032	0.02	6.20	0.00	
20	9.62	0.00	32.152	0.000	24.82	314.6	0.064	0.07	6.22	0.00	
30	9.55	0.00	32.166	0.000	24.84	312.7	0.095	0.15	6.18	0.00	
50	9.26	0.00	32.324	0.000	25.01	296.9	0.157	0.40	6.15	0.00	
75	8.84	0.00	32.750	0.000	25.40	259.4	0.227	0.84	5.12	0.00	
100	8.05	0.00	33.323	0.000	25.97	205.8	0.285	1.36	4.10	0.00	
150	7.65	0.00	33.838	0.000	26.43	162.8	0.378	2.52	2.79	0.00	
200	7.18	0.03	33.958	0.012	26.60	148.1	0.457	3.92	2.31	0.03	1.44
250	6.65	0.04	34.003	0.016	26.70	138.4	0.529	5.59	2.01	0.04	1.32
300	6.16	0.01	34.008	0.001	26.77	132.4	0.597	7.51	1.79	0.00	0.86
400	5.60	0.00	34.047	0.001	26.87	123.7	0.726	12.14	1.28	0.00	0.97
500	5.07	0.01	34.114	0.004	26.99	113.5	0.846	17.65	0.87	0.00	0.78
600	4.63	0.00	34.192	0.001	27.10	103.4	0.956	23.82	0.57	0.00	14.20
700	4.29	0.00	34.268	0.002	27.20	94.8	1.056	30.49	0.36	0.00	10.31

BROWN BEAR CRUISE 322 STATION 006 OBSERVED VALUES

DATE 18/04/63 HR 06.5 LAT 47-55 N LONG 125-33 W SNDG 256 WEA 03 WIND VEL 17 DIR 29
 BAROM 11.0 TEMP DRY 8.9 WET 7.2 RELHU 79 WTRCLR SECDI SEA 3 DIR 29 SWELL 1 DIR 27
 CLOUD TYPE 8 AMT 7 VIS 7 WIRE ANGLE(S) 12

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
1	0	9.73	31.898	24.60	12.50*	1.116	-0.554	199	0.59	1.0	7
1	5	9.71	31.908	24.61	11.72*	1.046	-0.484	186	0.61	1.1	7
1	10	9.75	31.918	24.61	11.50*	1.027	-0.465	183	0.64	0.7	8
1	20	9.68	32.096	24.76	12.38*	1.105	-0.543	197	0.68	0.9	6
1	30	9.62	32.160	24.82	12.75*	1.138	-0.575	202	0.67	1.2	7
1	49	9.46	32.224	24.90	8.53*	0.762	-0.197	135	0.74	1.9	8
1	74	8.99	32.904	25.50	7.18*	0.641	-0.074	113	1.35	10.5	15
1	99	8.04	33.486	26.10	5.03*	0.449	0.129	78	1.89	22.4	30
1	123	7.70	33.807	26.34	5.70*	0.509	0.075	87	2.02	24.0	33
1	147	7.53	33.860	26.47	5.47*	0.489	0.095	84	2.12	26.2	37
1	171	7.45	33.902	26.51	3.83*	0.342	0.242	69	2.06	23.3	32
1	197	7.08	33.944	26.60	3.35*	0.299	0.290	51	1.81	23.9	37

BROWN BEAR CRUISE 322 STATION 006 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.73	0.00	31.898	0.000	24.60	334.8	0.000	0.00			
10	9.75	0.00	31.918	0.000	24.61	333.8	0.034	0.02			
20	9.68	0.00	32.096	0.000	24.76	319.7	0.067	0.07			
30	9.62	0.00	32.160	0.000	24.82	314.2	0.099	0.15			
50	9.45	0.00	32.246	0.005	24.92	305.6	0.161	0.41			0.95
75	8.95	0.01	32.931	0.001	25.53	247.7	0.231	0.84			0.94
100	8.02	0.00	33.504	0.000	26.12	191.9	0.286	1.33			0.94
150	7.52	0.01	33.866	0.000	26.47	159.0	0.375	2.45			0.84

BROWN BEAR CRUISE 322 STATION 007 OBSERVED VALUES
 DATE 18/04/63 HR 08.9 LAT 47-50 N LONG 125-21 W WIND VEL 16 DIR 25
 BAROM 13.0 TEMP DRY 8.9 WET 6.5 RELHU 73 WIRCLR SEA DIR 25 SWELL DIR 27
 CLOUD TYPE VIS WIRE ANGLE(S) 12

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN
1	0	9.69	32.201	24.84	7.02	0.627	-0.065	112
1	5	9.70	32.208	24.85	6.59	0.589	-0.027	105
1	10	9.72	32.206	24.84	6.59	0.589	-0.027	105
1	19	9.72	32.202	24.84	6.55	0.585	-0.024	104
1	29	9.63	32.206	24.86	6.79	0.606	-0.044	108
1	48	9.50	32.288	24.94	6.25	0.558	0.005	99
1	72	8.77	32.784	25.44	5.41	0.483	0.089	84
1	96	8.16	33.283	25.92	4.30	0.384	0.193	67
1	121	7.86	33.516	26.15	3.84	0.343	0.237	59
1	145	7.89	33.624	26.23	3.84	0.343	0.237	59
1	168	7.68	33.816	26.41	2.92	0.261	0.321	45
1	195	7.39	33.907	26.53	2.69	0.240	0.345	41
1	289	6.14	34.010	26.77	1.90	0.170	0.433	28
1	484	5.12	34.111	26.98	0.85	0.076	0.542	12

BROWN BEAR CRUISE 322 STATION 007 BIOLOGICAL DATA
 INCOMING SOLAR RADIATION - AM 147 PM 55
 ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0145-0155 DEPTHS 100, 70
 35, 0

DEPTH	BROWN BEAR		CRUISE 322		STATION 007		INTERPOLATED AND COMPUTED VALUES							VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)				
0	9.69	0.00	32.201	0.000	24.84	311.7	0.000	0.00	7.02	0.00				
10	9.72	0.00	32.206	0.000	24.84	312.0	0.032	0.02	6.59	0.00				
20	9.71	0.00	32.202	0.000	24.84	312.4	0.063	0.07	6.58	0.01		0.88		
30	9.63	0.00	32.206	0.001	24.86	310.9	0.095	0.15	6.78	0.01		0.97		
50	9.45	0.01	32.321	0.006	24.97	300.0	0.156	0.40	6.19	0.00		0.91		
75	8.68	0.00	32.854	0.005	25.51	249.4	0.225	0.83	5.26	0.02		0.84		
100	8.09	0.00	33.334	0.004	25.98	205.6	0.283	1.34	4.19	0.01		0.81		
150	7.86	0.01	33.667	0.005	26.27	178.4	0.380	2.57	3.65	0.04		0.74		
200	7.32	0.01	33.917	0.002	26.54	153.1	0.463	4.05	2.65	0.00		1.06		
250	6.65	0.04	33.990	0.012	26.69	139.5	0.537	5.75	2.22	0.01		1.05		
300	5.99	0.01	34.008	0.004	26.79	130.3	0.605	7.66	1.81	0.00		44.74		

BROWN BEAR CRUISE 322 STATION 008 OBSERVED VALUES

DATE 18/04/63 HR 12.5 LAT 47-44 N LONG 125-08 W SNRG 439 WEA 02 WIND VEL 9 DIR 31
 BAROM 09.0 TEMP DRY 8.3 WET 5.9 RELHU 72 WTRCLR SECDI SEA 2 DIR 31 SWELL 1 DIR 31
 CLOUD TYPE 8 AMT 6 VIS 7 WIRE ANGLE(S) 14

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	ADU	SATN	PHOS	NITR	SIL
1	0	9.74	31.995	24.67	6.99	0.624	-0.063	111	0.47	0.4	4
1	5	9.77	32.004	24.68	6.55	0.585	-0.024	104	0.55	0.4	6
1	10	9.75	32.070	24.73	6.56	0.586	-0.025	104	0.59	0.9	7
1	19	9.68	32.368*	24.97	6.57	0.587	-0.025	104			
1	29	9.61	32.167	24.83	6.54	0.584	-0.021	104	0.67	6.1	8
1	49	9.32	32.157	24.87	6.14	0.548	0.018	97	0.80	4.2	10
1	73	9.04	33.214	25.74	4.60	0.411	0.155	73	1.25	14.2	20
1	98	8.46	33.644	26.16	4.33	0.387	0.185	68	1.61	15.5	23
1	122	7.94	32.971*	25.71	3.38	0.302	0.280	52	1.96	23.5	33
1	147	7.76	33.776	26.37	3.51	0.313	0.268	54	2.06	27.8	39
1	171	7.55	33.884	26.48	3.24	0.289	0.294	50	2.14	28.4	40
1	194	7.30	33.909	26.54	2.77	0.247	0.339	42	2.16	29.7	43
1	292	6.43	33.990	26.72	2.02	0.180	0.418	30	2.37	30.8	56

BROWN BEAR CRUISE 322 STATION 008 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.74	0.00	31.995	0.000	24.67	327.8	0.000	0.00	6.99	0.00	
10	9.75	0.00	32.070	0.000	24.73	322.5	0.033	0.02	6.56	0.00	1.23
20	9.67	0.00	32.143	0.006	24.80	316.1	0.065	0.07	6.57	0.00	0.98
30	9.60	0.00	32.158	0.007	24.82	314.0	0.097	0.15	6.53	0.00	
50	9.31	0.00	32.196	0.012	24.90	307.2	0.160	0.40	6.07	0.02	0.95
75	9.00	0.00	33.266	0.005	25.78	223.6	0.227	0.82	4.57	0.03	0.90
100	8.41	0.00	33.657	0.007	26.18	186.2	0.278	1.28	4.24	0.02	0.98
150	7.74	0.00	33.791	0.002	26.38	167.5	0.367	2.41	3.49	0.00	0.83
200	7.23	0.00	33.907	0.003	26.55	152.6	0.448	3.85	2.63	0.01	9.65
250	6.69	0.03	33.870	0.030	26.59	148.8	0.524	5.60	1.71	0.13	73.81

BROWN BEAR CRUISE 322 STATION 08A BIOLOGICAL DATA

DATE 18/04/63 LAT 47-43 N LONG 125-08 W

DEPTH CHL-A PRODUCTIVITY LAB-I DECK-I SAL

0 0.79 2.18 22.72 31.807

MESSENGER TIME 0510 INCOMING SOLAR RADIATION - AM 147 PM 55

24

BROWN BEAR CRUISE 322 STATION 009 OBSERVED VALUES

DATE 18/04/63 HR 14.2 LAT 47-40 N LONG 124-58 W SNRG 141 WEA 03 WIND VEL 9 DIR 31
 BAROM 09.0 TEMP DRY 8.4 WET 6.2 RELHU 72 WTRCLR SECDI 16 SEA 2 DIR 31 SWELL 1 DIR 31
 CLOUD TYPE 8 AMT 7 VIS 7 WIRE ANGLE(S) 4

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
1	0	9.97	31.518	24.26	6.65	0.594	-0.033	106	
1	5	9.96	31.521	24.27	6.71	0.599	-0.039	107	
1	10	9.99	31.553	24.29	5.68	0.507	0.053	91	
1	20	9.91	32.054	24.69	6.85	0.612	-0.053	109	
1	30	9.84	32.186	24.81	7.08	0.632	-0.073	113	
1	49	9.66	32.316	24.94	7.04	0.629	-0.067	112	
1	74	9.12	32.832	25.43	5.45	0.487	0.080	86	
1	99	8.45	33.366	25.95	4.32	0.386	0.187	67	
1	124	8.37	33.496	26.06	3.38	0.302	0.271	53	

BROWN BEAR CRUISE 322 STATION 009 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.41	0.74		31.514
5	0.39	0.77		31.505
15	0.64	0.71		31.990
33	0.41	0.62		31.524
100	0.06			33.080

16.60 23.14 - WATER COLUMN VALUES

MESSENGER TIME 0630 INCOMING SOLAR RADIATION - AM 147 PM 55

DEPTH	TEMP	E(T)	BROWN BEAR CRUISE 322 STATION 009					INTERPOLATED AND COMPUTED VALUES					VAR RATIO
			SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)			
0	9.97	0.00	31.518	0.000	24.26	366.7	0.000	0.00	6.65	0.00			
10	9.99	0.00	31.553	0.000	24.29	364.6	0.037	0.02	5.68	0.00			
20	9.91	0.00	32.054	0.000	24.69	326.4	0.072	0.07	6.85	0.00			
30	9.84	0.00	32.186	0.000	24.81	315.7	0.104	0.15	7.08	0.00			
50	9.64	0.00	32.333	0.002	24.95	302.1	0.167	0.41	6.99	0.01	0.95		
75	9.09	0.00	32.857	0.003	25.45	255.2	0.237	0.85	5.40	0.00	0.94		
100	8.43	0.00	33.382	0.001	25.96	207.0	0.295	1.37	4.28	0.00	5.15		

BROWN BEAR CRUISE 322 STATION 010 OBSERVED VALUES

DATE 18/04/63 HR 16.2 LAT 47-34 N LONG 124-44 W SNG 82 WEA 03 WIND VEL 7 DIR 28
 BAROM 08.0 TEMP DRY 9.7 WET 6.7 RELHU 61 WTRCLR SECDI 17 SEA 2 DIR 28 SWELL 1 DIR 28
 CLOUD TYPE 8 AMT 7 VIS 7 WIRE ANGLE(S) 5

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	PHOS	NITR	SIL
					MGA/L	AOU	SATN		
1	0	10.05	31.283	24.07	6.50	0.581	104	0.54	0.9
1	5	10.06	31.285	24.07	6.50	0.581	104	0.51	0.9
1	10	10.07	31.397	24.15	6.51	0.581	104	0.49	0.4
1	20	10.06	31.531	24.26	6.45	0.576	103	0.54	0.7
1	30	9.97	31.704	24.41	6.36	0.568	101	0.56	0.8
1	49	9.71	32.135	24.79	6.18	0.552	98	0.75	2.8
1	69	9.50	32.490	25.10	5.73	0.512	91	1.02	8.0

BROWN BEAR CRUISE 322 STATION 010 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY	SAL
	LAB-I	DECK-I	
0	0.39	1.07	31.277
5	0.34	1.09	31.273
15	0.37	0.87	31.357
33	0.36	0.58	31.782
70	0.16	0.13	32.686

11.94 28.13 - WATER COLUMN VALUES

MESSANGER TIME 0830 INCOMING SOLAR RADIATION - AM 147 PM 55

BROWN BEAR			CRUISE 322			STATION 010			INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO		
0	10.05	0.00	31.283	0.000	24.07	385.4	0.000	0.00	6.50	0.00			
10	10.07	0.00	31.397	0.000	24.15	377.4	0.039	0.02	6.51	0.00			
20	10.06	0.00	31.531	0.000	24.26	367.5	0.076	0.08	6.45	0.00			
30	9.97	0.00	31.704	0.000	24.41	353.4	0.113	0.17	6.36	0.00			
50	9.70	0.00	32.158	0.001	24.81	315.9	0.180	0.44	6.17	0.00			12.81

BROWN BEAR CRUISE 322 STATION 011 OBSERVED VALUES

KALALOGH ROCKS

DATE 18/04/63 HR 18.0 LAT 47-33 N LONG 124-33 W SNOG 36 WEA 02 WIND VEL 2 DIR 35
 BAROM 08.0 TEMP DRY 9.9 WEI 6.7 RELHU 61 WTRCLR SECDI SEA 2 DIR 35 SWELL 1 DIR 19
 CLOUD TYPE 8 AMT 7 VIS 7 WIRE ANGLE(S) 5

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
1	0	10.46	27.930	21.40	8.22	0.734	-0.166	129	
1	5	10.21	30.804	23.67	6.45	0.576	-0.016	103	
1	10	10.18	31.146	23.94	6.37	0.569	-0.010	102	
1	20	10.11	31.364	24.12	6.32	0.564	-0.005	101	
1	30	10.01	31.484	24.23	6.35	0.567	-0.007	101	

BROWN BEAR		CRUISE 322		STATION 011		INTERPOLATED AND COMPUTED VALUES					
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEO POT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.46	0.00	27.930	0.000	21.40	640.7	0.000	0.00	8.22	0.00	
10	10.18	0.00	31.146	0.000	23.94	397.7	0.053	0.02	6.37	0.00	
20	10.11	0.00	31.364	0.000	24.12	380.7	0.092	0.08	6.32	0.00	
30	10.01	0.00	31.484	0.000	24.23	370.4	0.130	0.18	6.35	0.00	

BROWN BEAR CRUISE 322 STATION 012 OBSERVED VALUES

QUEETS RIVER

DATE 18/04/63 HR 19.7 LAT 47-28 N LONG 124-32 W SNDC 40 MEA 02 WIND VEL 2 DIR 05
 BAROM 08.0 TEMP DRY 11.1 WET 7.8 RELHU 63 WTRCLR SECDI SEA 2 DIR 05 SWELL 1 DIR 28
 CLOUD TYPE 8 AMT 7 VIS 7 WIRE ANGLE(S) ---

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	ADU	SATM	PHOS	NITR	SIL
1	0	10.10	29.917	23.00	6.55	0.585	-0.020	104	0.51	0.7	1.0	15
1	5	10.27	30.755	23.62	6.61	0.590	-0.031	105	0.46	0.7	0.7	13
1	10	10.15	31.288	24.06	6.38	0.570	-0.011	102	0.59	1.1	1.1	8
1	20	10.01	31.444	24.20	6.34	0.566	-0.006	101	0.54	1.1	1.1	9
1	30	9.76	31.940	24.63	6.15	0.549	0.012	98	0.74	1.6	1.6	9

BROWN BEAR CRUISE 322 STATION 012 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	LIGHT SAT PROD	SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	0.95	2.75	16.58	2.54	100	50	29.298	0.67	1.4	19
3	0.69	2.11	7.96	2.21	66		30.344	0.70	1.3	13
				1.94	50					
				1.45	35					
				0.67	16					
				0.16	5					
11	0.51	1.15	1.86			10	31.221	0.56	0.9	9
20	0.60	1.46	0.00			1	31.439	0.65	1.0	9
30	0.88	1.34					31.734	0.79	1.2	9

12.22 32.08 84.46 - WATER COLUMN VALUES

MESSENGER TIME 1130 INCOMING SOLAR RADIATION - AM 147 PM 55

LIGHT SATURATION INCUBATOR ILLUMINATION 19400

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.10	0.00	29.917	0.000	23.00	487.5	0.000	0.00	6.55	0.00	
10	10.15	0.00	31.288	0.000	24.06	386.8	0.045	0.02	6.38	0.00	
20	10.01	0.00	31.444	0.000	24.20	373.2	0.083	0.08	6.34	0.00	
30	9.76	0.00	31.940	0.000	24.63	332.7	0.118	0.17	6.15	0.00	

MOCLIPS RIVER

DATE 18/04/63 HR 21-9 LAT 47-14 N LONG 124-35 W WIND VEL 9 DIR 14
BAROM 08-0 TEMP DRY 8.9 WET 7.2 RELHU 79 WTRCLR DIR 14 SWELL DIR 27
CLOUD TYPE AMT VIS WIRE ANGLE(S) 10 SNGD 70 WEA SEA

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MG/L	OXYGEN	AOU	- - -	- - -
1	0	10.25	29.077	22.32	6.76	0.604	-0.037			107
1	5	10.25	29.214	22.43	6.79	0.606	-0.040			107
1	10	10.08	30.974	23.82	6.42	0.573	-0.012			102
1	20	10.02	31.621	24.34	6.27	0.560	-0.001			100
1	29	9.96	31.840	24.52	6.50	0.581	-0.021			104

DEPTH	BROWN BEAR		CRUISE 322		STATION 013		INTERPOLATED AND COMPUTED VALUES				
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.25	0.00	29.077	0.000	22.32	552.2	0.000	0.00	6.76	0.00	
10	10.08	0.00	30.974	0.000	23.82	408.9	0.049	0.02	6.42	0.00	
20	10.02	0.00	31.621	0.000	24.34	360.2	0.088	0.08	6.27	0.00	

BROWN BEAR CRUISE 322 STATION 014 OBSERVED VALUES
 DATE 18/04/63 HR 23.6 LAT 47-14 N LONG 124-51 W SNRG 155 WEA
 BAROM TEMP DRY 8.3 WET 6.7 RELHU 79 WTRCLR SECDI 6 SEA
 CLOUD TYPE VIS 6 WIRE ANGLE(S) 3 WIND VEL 0 DIR
 DIR SWELL DIR
 CST DEPTH TEMP SAL SIGMA-T ML/L MGA/L OXYGEN AOU SATN
 1 0 9.94 29.546 22.74 6.65 0.594 -0.025 104
 1 5 9.99 29.742 22.88 6.43 0.574 -0.007 101
 1 10 9.90 31.967 24.63 6.40 0.572 -0.012 102
 1 20 9.91 32.006 24.65 6.07 0.542 0.017 97
 1 30 9.83 32.164 24.79 5.85 0.522 0.037 93
 1 50 9.73 32.508 25.07 5.49 0.490 0.069 88
 1 75 9.48 32.836 25.37 4.79 0.428 0.134 76
 1 100 8.88 33.201 25.75 3.82 0.341 0.227 60
 1 125 8.57 33.438 25.98 3.33 0.297 0.274 52
 1 150 7.95 33.720 26.30

BROWN BEAR CRUISE 322 STATION 014 BIOLOGICAL DATA
 DEPTH CHL-A PRODUCTIVITY SAL
 LAB-I DECK-I
 0 2.50 7.00 29.588
 3 2.45 6.90 29.695
 11 0.86 0.65 31.965
 20 0.63 0.44 31.999
 27.34 54.96 - WATER COLUMN VALUES
 MESSENGER TIME 1550 INCOMING SOLAR RADIATION - AM 147 PM 55

BROWN BEAR			CRUISE 322			STATION 014			INTERPOLATED AND COMPUTED VALUES						
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO				
0	9.94	0.00	29.546	0.000	22.74	512.6	0.000	0.00	6.65	0.00	0.00				
10	9.90	0.00	31.967	0.000	24.63	332.5	0.043	0.02	6.40	0.00	0.00				
20	9.91	0.00	32.006	0.000	24.65	329.9	0.076	0.07	6.07	0.00	0.00				
30	9.83	0.00	32.164	0.000	24.79	317.2	0.109	0.15	5.85	0.00	0.00				
50	9.73	0.00	32.508	0.000	25.07	290.5	0.170	0.40	5.49	0.00	0.00				
75	9.48	0.00	32.836	0.000	25.37	262.8	0.240	0.84	4.79	0.00	0.00				
100	8.88	0.00	33.201	0.000	25.75	227.0	0.302	1.39	3.82	0.00	0.00				
150	7.95	0.00	33.720	0.000	26.30	175.8	0.403	2.66							

BROWN BEAR CRUISE 322 STATION 015 OBSERVED VALUES

DATE 19/04/63 HR 01.9 LAT 47-14 N LONG 125-06 W SNCG 736 WEA 53 WIND VEL 21 DIR 33
 BAROM 04.0 TEMP DRY 6.7 WET 5.7 RELHU 85 WTRCLR SECDI 8 SEA 2 DIR 33 SWELL 1 DIR 31
 CLOUD TYPE 9 AMT 9 VIS 6 WIRE ANGLE(S) 35,22

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN		PHOS	NITR	SIL
					ML/L	MGA/L AOU			
2	0	9.73	31.722	24.46	6.22	0.556	0.007	99	0.50
2	5	9.74	31.714	24.45	6.22	0.556	0.007	99	0.43
2	9	9.86	31.916	24.59	6.25	0.558	-0.002	100	0.45
2	18	9.87	32.036	24.68	6.15	0.549	0.011	98	0.60
2	27	9.78	32.123	24.77	5.95	0.531	0.029	95	0.74
2	44	9.45	32.520	25.13	5.53	0.494	0.069	88	0.99
2	66	9.04	32.850	25.45	4.86	0.434	0.133	77	1.27
2	87	8.55	33.286	25.87	3.85	0.344	0.228	60	1.74
2	112	8.20	33.622	26.18	3.18	0.284	0.291	49	2.09
2	135	7.83	33.782	26.36	2.87	0.256	0.323	44	2.11
2	155	7.67	33.868	26.45	2.34	0.209	0.373	36	2.22
1	237	6.60	33.976	26.69	2.12	0.189	0.407	32	2.41
1	318	5.87	34.018	26.82	1.60	0.143	0.464	24	2.51
1	434	5.12	34.098	26.97	0.81	0.072	0.545	12	2.67
2	633	4.47	34.234	27.15	0.35	0.031	0.596	5	3.00

BROWN BEAR CRUISE 322 STATION 015 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	1-12	2-29		31-968
5	1-22	2-59		31-974
15	1-23	2-44		31-954
33	0-38	0-51		32-171
100	0-04	0-07		33-450

32.48 63.91 - WATER COLUMN VALUES

MESSENGER TIME 1815 INCOMING SOLAR RADIATION - AM 147 PM 55

BROWN BEAR			CRUISE 322			STATION 015			INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO		
0	9-73	0-00	31-722	0-000	24-46	347-9	0-000	0-00	6-22	0-00			
10	9-87	0-00	31-942	0-007	24-61	334-0	0-035	0-02	6-25	0-00	0-97		
20	9-86	0-00	32-053	0-003	24-70	325-6	0-068	0-07	6-11	0-00	0-75		
30	9-73	0-01	32-187	0-010	24-82	313-9	0-100	0-15	5-88	0-00	0-91		
50	9-34	0-00	32-614	0-011	25-22	276-7	0-160	0-39	5-37	0-01	0-76		
75	8-82	0-01	33-038	0-011	25-63	237-8	0-225	0-80	4-42	0-03	0-63		
100	8-36	0-01	33-484	0-001	26-05	198-3	0-279	1-29	3-44	0-01	0-67		
150	7-70	0-01	33-850	0-001	26-44	162-7	0-370	2-43	2-48	0-01	0-63		
200	7-10	0-04	33-956	0-014	26-60	147-3	0-449	3-83	2-04	0-14	1-30		
250	6-47	0-00	33-985	0-002	26-71	137-4	0-520	5-48	2-05	0-01	0-80		
300	6-01	0-00	34-011	0-002	26-79	130-3	0-588	7-38	1-73	0-01	0-71		
400	5-31	0-00	34-073	0-001	26-93	118-2	0-713	11-86	1-02	0-02	0-67		
500	4-83	0-00	34-147	0-001	27-04	108-1	0-827	17-12	0-47	0-02	16-67		
600	4-53	0-00	34-215	0-001	27-13	100-6	0-933	23-06	0-39	0-03	15-00		

DATE 19/04/63 HR 04.8 LAT 47-14 N LONG 125-20 W
BAROM 03.0 TEMP DRY 7.3 WET 5.9 RELHU 86 WTRCLR
CLOUD TYPE 9 AMT 6 VIS 6 WIRE ANGLE(S) 7
SDNG 1646 WEA 03 WIND VEL 10 DIR 33
SECDI SEA 2 DIR 33 SWELL 1 DIR 27

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MG/L	OXYGEN	ADU	SATN
1	0	9.75	31.996	24.67	6.71	0.599	-0.038		107
1	5	9.77	31.998	24.67	6.59	0.589	-0.027		105
1	10	9.79	31.997	24.67	6.42	0.573	-0.012		102
1	20	9.82	32.021	24.68	6.35	0.567	-0.007		101
1	30	9.64	32.229	24.87	6.20	0.554	0.008		99
1	49	9.53	32.329	24.97	6.20	0.554	0.009		98
1	74	8.52	32.943	25.60	4.80	0.429	0.145		75
1	99	8.17	33.372	25.99	4.19	0.374	0.203		65
1	125	7.96	33.657	26.25	3.05	0.272	0.306		47
1	150	7.70	33.791	26.39	2.63	0.235	0.347		40
1	175	7.56	33.880	26.48	2.55	0.228	0.355		39
1	199	7.21	33.932	26.57	2.39	0.213	0.374		36
1	298	6.16	33.991	26.76	1.90	0.170	0.433		28

BROWN BEAR CRUISE 322 STATION 016 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	1.31	1.68		31.989
5	1.48	1.78		32.020
15	1.48	1.58		32.023
33	0.56	0.39		32.242
100	0.02	0.02		33.412

40.19 43.13 - WATER COLUMN VALUES

MESSENGER TIME 2120 INCOMING SOLAR RADIATION - AM 147 PM 55

DEPTH	BROWN BEAR		CRUISE 322		STATION 016		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	9.75	0.00	31.996	0.000	24.67	327.8	0.000	0.00	6.71	0.00		
10	9.79	0.00	31.997	0.000	24.67	328.6	0.034	0.02	6.42	0.00		
20	9.82	0.00	32.021	0.000	24.68	327.4	0.067	0.07	6.35	0.00		
30	9.64	0.00	32.229	0.000	24.87	309.4	0.099	0.15	6.20	0.00		
50	9.49	0.01	32.350	0.005	24.99	298.5	0.160	0.40	6.15	0.02	0.95	
75	8.50	0.00	32.963	0.000	25.62	238.6	0.228	0.83	4.77	0.01	0.94	
100	8.16	0.00	33.386	0.000	26.00	202.8	0.283	1.32	4.14	0.01	0.95	
150	7.70	0.00	33.791	0.000	26.39	167.0	0.376	2.49	2.63	0.00		
200	7.19	0.00	33.934	0.000	26.57	150.1	0.456	3.92	2.38	0.00	5.40	
250	6.32	0.09	33.974	0.006	26.72	136.3	0.528	5.58	2.00	0.04	67.28	

BROWN BEAR CRUISE 322 STATION 017 OBSERVED VALUES

DATE 19/04/63 HR 07.1 LAT 47-13 N LONG 125-34 W SNOG 1554 WEA 50 WIND VEL 10 DIR 34
 BAROM 03.0 TEMP DRY 6.6 WET 5.6 RELHU 85 WTRCLR SECDI SEA 2 DIR 34 SWELL 1 DIR 30
 CLOUD TYPE 9 AMT 6 VIS 6 WIRE ANGLE(S) 15, 5

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN
2	0	9.19	32.216	24.93	5.98	0.534	0.034	94
2	5	9.22	32.219	24.93	6.37	0.569	-0.001	100
2	10	9.25	32.230	24.93	6.36	0.568	-0.001	100
2	20	9.26	32.226	24.93	6.55	0.585	-0.018	103
2	30	9.23	32.232	24.94	6.51	0.581	-0.014	102
2	49	9.20	32.307	25.00	6.17	0.551	0.016	97
2	74	8.68	32.724	25.41	5.23	0.467	0.106	82
2	99	8.30	33.156	25.80	4.39	0.392	0.184	68
2	123	8.06	33.516	26.12	3.84	0.343	0.235	59
2	148	7.95	33.684	26.27	3.28	0.293	0.285	51
2	172	7.86	33.763	26.34	3.23	0.288	0.291	50
1	194	7.49	33.886	26.49	2.83	0.253	0.331	43
1	288	6.37	34.004	26.74	1.77	0.158	0.441	26
1	480	4.84	34.156	27.05	0.62	0.055	0.566	9
1	719	4.07	34.290	27.24	0.27	0.024	0.609	4
1	961	3.54	34.402	27.38	0.27	0.024	0.617	4
1	1444	2.61	34.530	27.57	0.71	0.063	0.593	10

BROWN BEAR CRUISE 322 STATION 017 BIOLOGICAL DATA

INCOMING SOLAR RADIATION - AM 135 PM 142

ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0040-0050 DEPTHS 100, 70
 0105-0115 35, 0

ZOOPLANKTON HAUL TIMES ESTIMATED FROM SAMPLE BOTTLE LABEL INFORMATION

BROWN BEAR			CRUISE 322			STATION 017			INTERPOLATED AND COMPUTED VALUES						
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO				
0	9.19	0.00	32.216	0.000	24.93	303.0	0.000	0.00	5.98	0.00					
10	9.25	0.00	32.230	0.000	24.93	303.0	0.031	0.02	6.36	0.00					
20	9.26	0.00	32.226	0.000	24.93	303.7	0.062	0.06	6.55	0.00					
30	9.23	0.00	32.232	0.000	24.94	302.9	0.092	0.14	6.51	0.00					
50	9.18	0.00	32.320	0.002	25.02	296.0	0.152	0.39	6.14	0.00	0.95				
75	8.66	0.00	32.742	0.000	25.43	257.4	0.222	0.83	5.19	0.00	0.94				
100	8.29	0.00	33.173	0.001	25.82	220.3	0.282	1.36	4.36	0.00	0.94				
150	7.95	0.00	33.691	0.002	26.28	177.9	0.383	2.63	3.27	0.01	0.88				
200	7.40	0.01	33.906	0.008	26.52	155.1	0.467	4.12	2.74	0.01	1.19				
250	6.72	0.05	34.046	0.058	26.73	136.2	0.540	5.80	2.06	0.07	3.55				
300	6.14	0.07	34.145	0.086	26.88	122.0	0.605	7.64	1.51	0.10	5.48				
400	5.27	0.06	34.218	0.074	27.05	106.9	0.721	11.75	0.81	0.08	3.56				
500	4.87	0.10	34.164	0.004	27.05	107.4	0.829	16.75	0.67	0.08	0.54				
600	4.41	0.08	34.227	0.003	27.15	98.3	0.933	22.60	0.39	0.07	0.70				
700	4.11	0.02	34.281	0.001	27.22	91.7	1.029	29.01	0.27	0.01	0.92				
800	3.86	0.02	34.331	0.000	27.29	86.0	1.118	35.92	0.23	0.02	0.60				
1000	3.48	0.01	34.417	0.000	27.40	76.8	1.283	51.08	0.30	0.01	3.63				
1200	3.16	0.03	34.481	0.000	27.48	69.9	1.432	67.84	0.51	0.03	5.50				

BROWN BEAR CRUISE 322 STATION 018 OBSERVED VALUES

DATE 19/04/63 HR 12.0 LAT 47-13 N LONG 125-50 W SNOG 1719 WEA 02 WIND VEL 31 DIR 31
 BAROM 06.0 TEMP DRY 7.3 WET 5.4 RELHU 78 WTRCLR SEA 4 DIR 31 SWELL 3 DIR 31
 CLOUD TYPE 8 AMT 6 VIS 7 WIRE ANGLE(S) 21

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	AOU	SATN
1	0	9.27	32.286	24.98	6.42	0.573	-0.007	101
1	5	9.31	32.297	24.98	6.44	0.575	-0.009	102
1	10	9.40	32.326	24.99	6.46	0.577	-0.012	102

DATA FROM REMAINDER OF DEPTHS SAMPLED AT THIS STATION WERE
 CONSIDERED UNRELIABLE

BROWN BEAR CRUISE 322 STATION 018 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.92	1.22	12.00	32.274
5	0.84	1.42		32.283
15	0.88	1.27		32.295
33	0.75	0.98		32.340
100	0.95	1.05		33.261

27.67 40.30 - WATER COLUMN VALUES

MESSANGER TIME 0455 INCOMING SOLAR RADIATION - AM 135 PM 142

BROWN BEAR CRUISE 322 STATION 018 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.27	0.00	32.286	0.000	24.98	299.0	0.000	0.00	6.42	0.00	
10	9.40	0.00	32.326	0.000	24.99	298.2	0.031	0.02	6.46	0.00	

BROWN BEAR CRUISE 322 STATION 020 OBSERVED VALUES

DATE 19/04/63 HR 20.5 LAT 47-16 N LONG 126-18 W SNRG 2377 WEA 02 WIND VEL 21 DIR 32
 BAROM 28.0 TEMP DRY 9.3 WET 5.8 RELHU 54 WTRCLR SEA 4 DIR 32 SWELL 3 DIR 31
 CLOUD TYPE 8 AMT 7 VIS 7 WIRE ANGLE(S) 15

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN
1	0	9.34	32.293	24.97	7.20	0.643	-0.077	114
1	4	9.30	32.295	24.98	6.43	0.574	-0.008	101
1	9	9.34	32.298	24.97	7.04	0.629	-0.063	111
1	17	9.34	32.310	24.98	6.57	0.587	-0.021	104
1	26	9.31	32.305	24.98	7.18	0.641	-0.075	113
1	43	9.32	32.314	24.99	6.36	0.568	-0.002	100
1	65	8.99	32.770	25.40	5.80	0.518	0.050	91
1	87	8.16	33.169	25.84	5.38	0.481	0.097	83
1	110	8.25	33.566	26.13	4.07	0.364	0.211	63
1	132	8.07	33.722	26.28	3.15	0.281	0.295	49
1	155	7.94	33.826	26.38	2.79	0.249	0.329	43
1	177	7.54	33.862	26.47	3.11*	0.278	0.305	48
1	264	6.46	33.980	26.71	2.23	0.199	0.399	33

BROWN BEAR CRUISE 322 STATION 020 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	LIGHT SAT PROD	SAT FILT	SAL	PHOS	NITR	SIL
0	0.65	0.98	5.44	1.46	100	32.300	0.84	2.1	9
5	0.79	1.07	7.90	1.46	66	32.304	0.84	2.3	9
15	0.84	0.73	1.52	1.58	50	32.312	0.81	1.8	9
				1.25	35				
				0.86	16				
				0.30	5				
33	0.82	0.53	1.02			32.302	0.80	1.7	6

26.66 25.45 103.12 - WATER COLUMN VALUES

MESSANGER TIME 1150 INCOMING SOLAR RADIATION - AM 135 PM 142

LIGHT SATURATION INCUBATOR ILLUMINATION 19700

DEPTH	BROWN BEAR		CRUISE 322		STATION 020		INTERPOLATED AND COMPUTED VALUES				
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.34	0.00	32.293	0.000	24.97	299.5	0.000	0.00	7.20	0.00	
10	9.34	0.00	32.300	0.000	24.97	299.3	0.031	0.02	7.00	0.05	0.90
20	9.33	0.00	32.309	0.001	24.98	298.6	0.061	0.06	6.75	0.07	0.68
30	9.32	0.01	32.293	0.008	24.97	299.8	0.091	0.14	7.09	0.09	0.88
50	9.26	0.00	32.435	0.020	25.09	288.7	0.150	0.38	6.14	0.02	0.73
75	8.59	0.06	32.956	0.002	25.60	240.4	0.217	0.80	5.65	0.04	0.64
100	8.17	0.05	33.409	0.009	26.02	201.1	0.272	1.30	4.67	0.05	0.66
150	7.98	0.01	33.809	0.000	26.36	169.6	0.366	2.47	2.84	0.02	0.76
200	7.01	0.06	33.866	0.010	26.55	152.7	0.447	3.92	2.01	0.21	33.75
250	6.65	0.05	33.918	0.015	26.64	144.8	0.522	5.65	2.71	0.17	49.96

BROWN BEAR CRUISE 322 STATION 021 OBSERVED VALUES

DATE 19/04/63 HR 23.3 LAT 47-13 N LONG 126-26 W WEA 02 WIND VEL 19 DIR 31
 BAROM 11.0 TEMP DRY 7.8 WET 6.2 RELHU 79 WTRCLR SECDI 2468 SEA 4 DIR 31 SWELL 3 DIR 31
 CLOUD TYPE 8 AMT 7 VIS 7 WIRE ANGLE(S) 15.39

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN
1	0	9.32	32.341	25.01	6.43	0.574	-0.009	102
1	5	9.32	32.338	25.01	6.38	0.570	-0.004	101
1	9	9.34	32.338	25.00	6.45	0.576	-0.011	102
1	19	9.35	32.340	25.00				
1	28	9.31	32.336	25.01	6.48	0.579	-0.013	102
1	48	9.32	32.344	25.01	6.36	0.568	-0.002	100
1	71	8.76	32.778	25.44	5.28	0.472	0.100	83
1	95	8.23	33.220	25.86	4.45	0.397	0.179	69
1	119	8.06	33.598	26.19	3.52	0.314	0.263	54
1	143	7.81	33.778	26.36	2.95	0.263	0.316	45
2	156	7.52	33.846	26.46	3.10	0.277	0.307	47
1	167	7.38	33.869	26.50	3.05	0.272	0.313	47
2	238	6.66	33.948	26.66	2.72	0.243	0.352	41
2	400	5.31	34.055	26.91	1.23	0.110	0.505	18
2	603	4.33	34.176	27.12	0.68	0.061	0.569	10
2	814	3.91	34.320	27.28	0.29	0.026	0.610	4
2	1252	2.94	34.486	27.50	0.52	0.046	0.605	7
2	1713	2.16	34.573	27.64	1.14	0.102	0.562	15
2	2137	1.82	34.619	27.70	2.21	0.197	0.472	29

DEPTH	BROWN BEAR		CRUISE 322		STATION 021		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMLY	GEOPT ANOMLY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	9.32	0.00	32.341	0.000	25.01	295.7	0.000	0.00	6.43	0.00	1.12	
10	9.34	0.00	32.338	0.000	25.00	296.4	0.030	0.02	6.46	0.00	1.47	
20	9.35	0.00	32.340	0.000	25.01	296.5	0.060	0.06	6.51	0.01	0.98	
30	9.32	0.01	32.329	0.005	25.00	297.1	0.090	0.14	6.49	0.01		
50	9.28	0.01	32.373	0.006	25.04	293.6	0.150	0.38	6.28	0.02	0.89	
75	8.66	0.01	32.854	0.001	25.51	249.0	0.218	0.81	5.13	0.01	0.80	
100	8.18	0.01	33.310	0.004	25.94	208.7	0.276	1.33	4.25	0.01	0.76	
150	7.65	0.01	33.819	0.001	26.42	164.2	0.370	2.50	3.02	0.02	0.63	
200	7.02	0.01	33.914	0.004	26.58	149.2	0.449	3.91	2.91	0.01	2.34	
250	6.54	0.00	33.958	0.001	26.68	140.4	0.522	5.60	2.61	0.02	0.99	
300	6.09	0.00	33.996	0.004	26.77	132.4	0.590	7.54	2.16	0.03	0.89	
400	5.31	0.00	34.055	0.000	26.91	119.6	0.718	12.08	1.23	0.00		
500	4.74	0.01	34.114	0.001	27.02	109.5	0.833	17.40	0.86	0.05	0.67	
600	4.34	0.00	34.174	0.000	27.12	101.3	0.940	23.40	0.68	0.00	0.98	
700	4.10	0.03	34.244	0.002	27.20	94.4	1.038	29.99	0.47	0.01	0.61	
800	3.93	0.01	34.311	0.001	27.27	88.3	1.131	37.10	0.31	0.00	0.88	
1000	3.49	0.01	34.406	0.004	27.39	77.8	1.299	52.55	0.28	0.04	0.83	
1200	3.05	0.01	34.473	0.002	27.48	69.2	1.448	69.32	0.45	0.02	0.85	
1500	2.48	0.01	34.541	0.002	27.59	59.3	1.643	96.28	0.79	0.01	0.66	
2000	1.88	0.00	34.605	0.001	27.69	49.8	1.920	145.71	1.80	0.00	3.53	

BROWN BEAR CRUISE 322 STATION 022 OBSERVED VALUES
 DATE 20/04/63 HR 04.7 LAT 47-15 N LONG 126-39 W SNDG 2515 WEA 02 WIND VEL 10 DIR 32
 BAROM 11.0 TEMP DRY 7.8 WET 5.4 RELHU 72 WTRCLR SECDI SEA 4 DIR 32 SWELL 2 DIR 30
 CLOUD TYPE 8 AMT 7 VIS 7 WIRE ANGLE(S) 16

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
1	0	9.29	32.486	25.13	6.37	0.569	-0.003		101
1	5	9.27	32.486	25.13	6.41	0.573	-0.007		101
1	10	9.31	32.482	25.12	6.35	0.567	-0.002		100
1	19	9.31	32.486	25.13	6.53	0.583	-0.018		103
1	28	9.29	32.492	25.13	6.50	0.581	-0.015		103
1	47	9.30	32.482	25.12	6.36	0.568	-0.003		101
1	71	9.25	32.481	25.13	5.54	0.495	0.071		87
1	96	7.74	32.928	25.71	4.79	0.428	0.157		73
1	119	7.25	33.348	26.11	4.78	0.427	0.163		72
1	143	7.04	33.626	26.35	3.81	0.340	0.257		57
1	167	7.06	33.830	26.51	3.55	0.317	0.273		54
1	191	6.85	33.909	26.60	2.56	0.229	0.364		39
1	285	5.74	33.961	26.79	3.07*	0.274	0.335		45

BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY	SAL
	LAB-I	DECK-I	
0	0.34	0.36	32.474
5	0.33	0.36	32.474
15	0.38	0.37	32.468
33	0.34	0.25	32.472

11.73 11.01 - WATER COLUMN VALUES

MESSANGER TIME 2015 INCOMING SOLAR RADIATION - AM 135 PM 142

DEPTH	BROWN BEAR		CRUISE 322		STATION 022		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEO POT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	9.29	0.00	32.486	0.000	25.13	284.5	0.000	0.00	6.37	0.00		
10	9.31	0.00	32.482	0.000	25.12	285.2	0.029	0.02	6.35	0.00		
20	9.31	0.00	32.487	0.000	25.13	285.0	0.058	0.06	6.53	0.00	0.86	
30	9.29	0.00	32.491	0.001	25.13	284.6	0.087	0.13	6.50	0.01	0.96	
50	9.33	0.02	32.470	0.007	25.11	287.2	0.144	0.37	6.27	0.01	0.87	
75	9.02	0.06	32.537	0.010	25.21	278.0	0.215	0.83	5.39	0.01	0.81	
100	7.61	0.01	33.006	0.004	25.79	223.3	0.279	1.38	4.80	0.04	0.78	
150	7.05	0.02	33.696	0.002	26.41	165.1	0.376	2.60	3.74	0.05	0.70	
200	6.73	0.01	33.917	0.005	26.62	145.3	0.455	4.00			12.92	
250	6.00	0.07	34.031	0.028	26.81	128.0	0.523	5.58			59.30	

BROWN BEAR CRUISE 322 STATION 023 OBSERVED VALUES

DATE 20/04/63 HR 06.5 LAT 47-15 N LONG 127-01 W WEA 02 WIND VEL 14 DIR 31
 BAROM 12.0 TEMP DRY 8.1 WET 6.1 RELHU 72 WTRCLR SECDI 2377 SEA 3 DIR 31 SWELL 2 DIR 31
 CLOUD TYPE 8 AMT 7 VIS 7 WIRE ANGLE(S) 12, 5

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN
2	0	9.41	32.542	25.15	6.63	0.592	-0.028	105
2	5	9.43	32.551	25.16	6.36	0.568	-0.005	101
2	10	9.46	32.549	25.15	7.37	0.658	-0.095	117
2	20	9.47	32.542	25.14	6.57	0.587	-0.024	104
2	29	9.45	32.548	25.15	6.26	0.559	0.004	99
2	48	9.45	32.551	25.15	6.94	0.620	-0.057	110
2	73	9.44	32.543	25.15	6.94	0.620	-0.056	110
2	98	8.27	32.704	25.46	5.75	0.514	0.065	89
2	123	6.94	33.202	26.03	5.32	0.475	0.119	80
2	149	7.04	33.596	26.33	4.20	0.375	0.217	63
2	173	7.12	33.628	26.50	3.81	0.340	0.249	58
1	198	6.88	33.916	26.60				
1	296	5.89	33.976	26.77	1.97	0.176	0.430	29
1	489	4.78	34.109	27.02	0.84	0.075	0.548	12
1	733	4.08	34.295	27.24	0.27	0.024	0.609	4
1	980	3.48	34.406	27.39	0.43	0.038	0.604	6
1	1473	2.50	34.542	27.59	0.68	0.061	0.597	9
1	1768	2.12	34.588	27.65	1.12	0.100	0.564	15

BROWN BEAR CRUISE 322 STATION 023 BIOLOGICAL DATA

INCOMING SOLAR RADIATION - AM 308 PM 295

ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0110-0125 DEPTHS 100, 70
 35, 0

DEPTH	BROWN BEAR		CRUISE 322		STATION 023		INTERPOLATED AND COMPUTED VALUES					VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)		
0	9.41	0.00	32.542	0.000	25.15	282.1	0.000	0.00	6.63	0.00	0.98	
10	9.46	0.00	32.549	0.000	25.15	282.6	0.029	0.02	7.37	0.00		
20	9.47	0.00	32.542	0.000	25.14	283.4	0.057	0.06	6.57	0.00		
30	9.45	0.00	32.548	0.000	25.15	282.8	0.086	0.13	6.28	0.02		
50	9.47	0.01	32.547	0.002	25.15	283.5	0.143	0.37	6.98	0.00	0.91	
75	9.37	0.01	32.547	0.002	25.16	282.5	0.214	0.82	6.85	0.02	0.89	
100	8.14	0.02	32.740	0.006	25.50	250.4	0.281	1.42	5.71	0.02	0.89	
150	7.05	0.00	33.608	0.000	26.34	171.6	0.388	2.74	4.18	0.00	0.95	
200	6.86	0.00	33.919	0.002	26.61	146.7	0.468	4.16	3.36	0.02	1.58	
250	6.34	0.02	33.976	0.019	26.72	136.5	0.539	5.81	2.59	0.02	1.48	
300	5.86	0.00	33.979	0.000	26.79	130.8	0.607	7.71	1.93	0.01	6.99	
400	5.19	0.03	34.046	0.000	26.92	118.9	0.733	12.21	1.19	0.06	0.76	
500	4.74	0.00	34.118	0.001	27.03	109.2	0.848	17.51	0.80	0.00	0.95	
600	4.41	0.03	34.197	0.004	27.13	100.4	0.954	23.47	0.48	0.01	0.68	
700	4.15	0.01	34.271	0.002	27.21	92.8	1.051	29.98	0.30	0.00	0.83	
800	3.91	0.00	34.330	0.002	27.29	86.6	1.142	36.96	0.28	0.03	0.71	
1000	3.43	0.00	34.413	0.000	27.40	76.6	1.307	52.15	0.44	0.00	0.98	
1200	3.00	0.01	34.478	0.002	27.49	68.2	1.454	68.66	0.51	0.03	0.89	
1500	2.46	0.00	34.547	0.000	27.59	58.6	1.647	95.27	0.71	0.00	12.22	

BROWN BEAR CRUISE 322 STATION 024 OBSERVED VALUES

DATE 20/04/63 HR 12.1 LAT 47-14 N LONG 127-14 W WEA 02 WIND VEL 2 DIR 14
 BAROM 16.0 TEMP DRY 8.6 WET 6.7 RELHU 73 WTRCLR SEA 2 DIR 14 SWELL 1 DIR 31
 CLOUD TYPE 8 AMT 4 VIS 7 WIRE ANGLE(S) 9

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN
1	0	9.39	32.532	25.15	6.37	0.569	-0.005	101
1	5	9.44	32.538	25.14	6.48	0.579	-0.015	103
1	10	9.45	32.539	25.14	6.42	0.573	-0.010	102
1	20	9.46	32.537	25.14	6.41	0.573	-0.009	102
1	29	9.43	32.540	25.15	6.33	0.565	-0.002	100
1	48	9.43	32.540	25.15	6.31	0.564	0.000	100
1	73	9.39	32.538	25.15	6.28	0.561	0.003	99
1	98	8.22	32.850	25.58	5.72	0.511	0.068	88
1	125	6.89	33.181	26.02	5.32	0.475	0.120	80
1	147	6.95	33.492	26.26	4.79	0.428	0.166	70
1	172	7.15	33.827	26.50	3.99	0.356	0.233	61
1	196	6.94	33.890	26.57	3.56	0.318	0.274	54
1	292	5.59	33.950	26.80	2.68	0.239	0.372	39

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BROWN BEAR CRUISE 322 STATION 024 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY	SAL
0	0.36	0.37	32.546
5	0.31	0.66	32.546
15	0.28	0.37	32.548
33	0.31	0.27	32.550
100	0.08	0.01	32.924

10.03 18.48 - WATER COLUMN VALUES

MESSANGER TIME 0426 INCOMING SOLAR RADIATION - AM 308 PM 295

BROWN BEAR			CRUISE 322			STATION 024			INTERPOLATED AND COMPUTED VALUES						
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POI ENERGY	OXY ML/L	E(O)	VAR RATIO				
0	9.39	0.00	32.532	0.000	25.15	282.6	0.000	0.00	6.37	0.00					
10	9.45	0.00	32.539	0.000	25.14	283.1	0.029	0.02	6.42	0.00					
20	9.46	0.00	32.537	0.000	25.14	283.6	0.058	0.06	6.41	0.00					
30	9.43	0.00	32.540	0.000	25.15	283.1	0.086	0.13	6.33	0.00	0.98				
50	9.45	0.01	32.534	0.004	25.14	284.2	0.143	0.37	6.32	0.01	0.91				
75	9.32	0.01	32.557	0.004	25.18	280.9	0.214	0.82	6.24	0.01	0.89				
100	8.10	0.02	32.874	0.001	25.61	239.9	0.280	1.41	5.69	0.01	0.90				
150	6.98	0.01	33.540	0.004	26.29	175.8	0.385	2.71	4.69	0.01	0.86				
200	6.88	0.01	33.987	0.059	26.66	141.9	0.465	4.13	3.51	0.01	7.59				
250	5.92	0.12	34.074	0.075	26.85	123.8	0.532	5.66	3.16	0.09	61.91				

BROWN BEAR CRUISE 322 STATION 025 OBSERVED VALUES

DATE 20/04/63 HR 14.3 LAT 47-14 N LONG 127-31 W SNRG 2606 WEA 02 WIND VEL 3 DIR 31
 BAROM 15.0 TEMP DRY 8.5 WET 7.1 RELHU 86 WTRCLR SECDI SEA 2 DIR 31 SWELL 2 DIR 31
 CLOUD TYPE 8 AMT 6 VIS 7 WIRE ANGLE(S) 8

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
1	0	9.07	32.443	25.13	6.36	0.568	-0.001	100	100
1	5	9.08	32.445	25.13	6.37	0.569	-0.001	100	100
1	10	9.09	32.448	25.13	6.42	0.573	-0.005	101	101
1	20	9.12	32.443	25.12	6.36	0.568	0.000	100	100
1	30	9.09	32.434	25.12	6.36	0.568	0.000	100	100
1	49	9.08	32.450	25.13	6.38	0.570	-0.001	100	100
1	74	9.11	32.446	25.13	6.33	0.565	-0.003	100	100
1	99	7.60	32.940	25.74	5.42	0.484	0.102	83	83
1	124	6.80	33.038	25.92	5.29	0.472	0.125	79	79
1	149	7.05	33.650	26.37	4.30	0.384	0.207	65	65
1	174	7.21	33.842	26.50	3.68	0.329	0.259	56	56
1	199	6.89	33.900	26.59	3.42	0.305	0.287	52	52
1	298	5.64	33.932	26.78	2.62	0.234	0.376	38	38

BROWN BEAR		CRUISE 322		STATION 025		INTERPOLATED AND COMPUTED VALUES					
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.07	0.00	32.443	0.000	25.13	284.4	0.000	0.00	6.36	0.00	
10	9.09	0.00	32.448	0.000	25.13	284.5	0.029	0.02	6.42	0.00	
20	9.12	0.00	32.443	0.000	25.12	285.4	0.058	0.06	6.36	0.00	
30	9.09	0.00	32.434	0.000	25.12	285.8	0.087	0.13	6.36	0.00	
50	9.10	0.01	32.445	0.003	25.13	285.4	0.144	0.37	6.39	0.00	0.95
75	9.06	0.01	32.465	0.006	25.15	283.8	0.216	0.83	6.29	0.01	0.94
100	7.55	0.00	32.943	0.006	25.75	227.2	0.280	1.40	5.42	0.01	0.94
150	7.06	0.00	33.663	0.002	26.38	167.7	0.380	2.64	4.27	0.00	0.94
200	6.87	0.00	33.900	0.001	26.59	148.3	0.459	4.06	3.41	0.00	5.64
250	5.76	0.16	34.012	0.037	26.82	126.5	0.529	5.64	3.30	0.11	64.61

BROWN BEAR CRUISE 322 STATION 026 OBSERVED VALUES

DATE 20/04/63 HR 16.3 LAT 47-14 N LONG 127-45 W SNRG 2606 WEA 03 WIND VEL 7 DIR 27
 BAROM 15.0 TEMP DRY 9.8 WET 8.8 RELHU 87 WTRCLR SECDI 20 SEA 2 DIR 27 SWELL 2 DIR 27
 CLOUD TYPE 8 AMT 7 VIS 7 WIRE ANGLE(S) 7

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	ML/L	AOU	SATN
1	0	9.05	32.435	25.13	6.37	0.569	0.000	100	100
1	5	9.04	32.438	25.13	6.36	0.568	0.001	100	100
1	10	9.05	32.382	25.08	6.41	0.573	0.003	101	101
1	20	9.06	32.430	25.12	6.38	0.570	0.001	100	100
1	29	9.03	32.425	25.12	6.36	0.568	0.001	100	100
1	48	9.04	32.438	25.13	6.42	0.573	0.004	101	101
1	73	9.00	32.444	25.14	6.34	0.566	0.003	99	99
1	98	7.62	33.212	25.95	4.55	0.406	0.179	69	69
1	122	6.83	33.478	26.27	4.77	0.426	0.169	72	72
1	147	7.13	33.712	26.41	4.04	0.361	0.229	61	61
1	171	7.07	33.861	26.53	3.58	0.320	0.270	54	54
1	195	6.71	33.909	26.62	3.33	0.297	0.297	50	50
1	292	5.48	33.950	26.81	2.39	0.213	0.399	35	35

BROWN BEAR CRUISE 322 STATION 026 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	SAL
0	0.33	0.40	32.432
5	0.37	0.51	32.440
15	0.34	0.64	32.445
33	0.33	0.52	32.540
100	0.03	0.00	33.379

11.28 18.48 - WATER COLUMN VALUES

MESSENGER TIME 0845 INCOMING SOLAR RADIATION - AM 308 PM 295

BROWN BEAR CRUISE 322 STATION 026				INTERPOLATED AND COMPUTED VALUES							
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	9.05	0.00	32.435	0.000	25.13	284.7	0.000	0.00	6.37	0.00	
10	9.05	0.00	32.382	0.000	25.08	288.8	0.029	0.02	6.41	0.00	
20	9.06	0.00	32.430	0.000	25.12	285.5	0.058	0.06	6.38	0.00	
30	9.03	0.00	32.425	0.000	25.12	285.6	0.087	0.13	6.36	0.00	0.98
50	9.06	0.02	32.425	0.010	25.12	286.4	0.145	0.37	6.45	0.02	0.91
75	8.90	0.02	32.501	0.015	25.20	278.9	0.216	0.83	6.19	0.05	0.89
100	7.52	0.01	33.244	0.005	25.99	204.4	0.277	1.36	4.55	0.04	0.88
150	7.14	0.00	33.735	0.000	26.43	163.4	0.369	2.52	3.97	0.00	0.84
200	6.61	0.01	33.910	0.002	26.63	144.1	0.447	3.91	3.30	0.01	8.91
250	5.62	0.12	33.868	0.031	26.73	135.4	0.517	5.53	3.01	0.07	68.56

BROWN BEAR CRUISE 322 STATION 027 OBSERVED VALUES
 DATE 20/04/63 HR 18.7 LAT 47-13 N LONG 128-00 W WEA 01 WIND VEL 14 DIR 29
 BAROM 15.0 TEMP DRY 10.0 WET 8.8 RELHU 87 WTRCLR SECDI 21 SEA 2 DIR 29 SWELL 2 DIR 30
 CLOUD TYPE 0 AMT 3 VIS 7 WIRE ANGLE(S) 25.25

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN
2	0	9.00	32.404	25.11				
2	5	8.99	32.406	25.11				
2	9	8.97	32.404	25.11	6.61	0.590	-0.020	104
2	18	8.94	32.407	25.12	6.66	0.595	-0.024	104
2	26	8.90	32.408	25.13	6.71	0.599	-0.028	105
2	42	8.89	32.408	25.13	6.59	0.589	-0.018	103
2	64	8.75	32.463	25.19	6.45	0.576	0.070	99
2	86	7.52	33.150	25.91	5.23	0.467	0.119	80
2	107	7.23	33.419	26.16	4.47	0.399	0.190	68
2	127	7.24	33.660	26.35	3.99	0.356	0.232	61
2	147	7.24	33.854	26.50	3.17	0.283	0.304	48
1	176	6.99	33.905	26.58	3.18	0.284	0.307	48
1	265	6.13	33.983	26.75	2.05	0.183	0.420	30
1	443	4.90	34.097	26.99	0.85	0.076	0.545	12
1	668	4.11	34.238	27.19	0.28	0.025	0.608	4
1	896	3.49	34.361	27.35	0.26	0.023	0.619	4
1	1344	2.57	34.508	27.55	0.56	0.050	0.607	8
1	1633	2.25	34.547	27.61				

BROWN BEAR CRUISE 322 STATION 027 BIOLOGICAL DATA									
DEPTH	CHL-A	PRODUCTIVITY LAB-I	PRODUCTIVITY DECK-I	LIGHT PROD	SAT FILT	IRRAD	SAL	PHOS	SIL
0	0.19	0.46	2.92				32.404	0.96	9
7	0.24	0.43	5.10			50	32.402	0.98	9
21	0.33	0.51	1.14			10	32.411	0.96	9
40	0.31	0.42	0.30	0.36	100	1	32.400	0.95	9

11.56 18.42 85.44 - WATER COLUMN VALUES
MESSENGER TIME 1124 INCOMING SOLAR RADIATION - AM 308 PM 295
LIGHT SATURATION INCUBATOR ILLUMINATION 14500

DEPTH	BROWN BEAR		CRUISE 322		STATION 027		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEO POT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	9.00	0.00	32.404	0.000	25.11	286.2	0.000	0.00				
10	8.97	0.00	32.404	0.000	25.12	285.9	0.029	0.02	6.62	0.00	0.97	
20	8.93	0.00	32.407	0.000	25.12	285.3	0.058	0.06	6.68	0.00	0.71	
30	8.90	0.01	32.407	0.001	25.13	285.0	0.087	0.13	6.69	0.01	0.89	
50	8.91	0.04	32.388	0.022	25.11	286.9	0.144	0.37	6.60	0.04	0.73	
75	8.14	0.08	32.793	0.044	25.54	246.2	0.212	0.79	5.88	0.06	0.65	
100	7.26	0.02	33.351	0.013	26.11	192.9	0.267	1.28	4.69	0.00	0.68	
150	7.22	0.00	33.866	0.004	26.52	154.8	0.354	2.38	3.14	0.02	0.92	
200	6.76	0.01	33.933	0.003	26.63	144.4	0.430	3.73	2.94	0.07	1.11	
250	6.27	0.01	33.974	0.002	26.73	135.7	0.500	5.36	2.29	0.05	0.82	
300	5.84	0.00	34.008	0.001	26.81	128.4	0.567	7.24	1.73	0.02	0.91	
400	5.14	0.00	34.072	0.002	26.95	116.3	0.691	11.65	1.04	0.02	0.76	
500	4.65	0.02	34.134	0.001	27.05	107.0	0.803	16.83	0.63	0.02	0.76	
600	4.29	0.02	34.197	0.001	27.14	99.2	0.907	22.70	0.37	0.02	0.71	
700	4.01	0.00	34.257	0.000	27.22	92.4	1.004	29.16	0.26	0.01	0.83	
800	3.73	0.00	34.312	0.001	27.29	85.9	1.094	36.09	0.23	0.02	0.59	
1000	3.24	0.00	34.405	0.001	27.41	74.9	1.257	51.05	0.35	0.02	10.50	
1200	2.82	0.00	34.473	0.001	27.50	66.5	1.400	67.19	0.53	0.04	9.63	
1500	2.37	0.00	34.534	0.000	27.59	58.6	1.590	93.46			6.67	

BROWN BEAR CRUISE 322 STATION 028 OBSERVED VALUES
 DATE 21/04/63 HR 02.0 LAT 46-44 N LONG 128-30 W SNOG 2697 WEA 02 WIND VEL 19 DIR 33
 BAROM 16.0 TEMP DRY 9.5 WEI 8.3 RELHU 86 WTRCLR SECDI 15 SEA 4 DIR 33 SWELL 3 DIR 33
 CLOUD TYPE 0 AMT 3 VIS 7 WIRE ANGLE(S) 17

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
1	0	9.34	32.520	25.15	7.24	0.647	-0.082	115	
1	5	9.36	32.513	25.14	6.53	0.583	-0.019	103	
1	10	9.38	32.513	25.13	6.48	0.579	-0.015	103	
1	20	9.37	32.520	25.14	6.51	0.581	-0.017	103	
1	29	9.32	32.518	25.15	6.63	0.592	-0.027	105	
1	48	9.24	32.509	25.15	6.71	0.599	-0.033	106	
1	73	9.25	32.516	25.16	6.43	0.574	-0.008	101	
1	98	8.50	32.710	25.43	6.14	0.548	0.027	95	
1	123	7.25	33.046	25.87	5.61	0.501	0.090	85	
1	147	7.14	33.412	26.17	4.69	0.419	0.172	71	
1	170	7.01	33.738	26.45	4.36	0.389	0.202	66	
1	195	6.94	33.844	26.54	4.33	0.387	0.205	65	
1	293	5.48	33.935	26.80	2.77	0.247	0.365	40	

BROWN BEAR CRUISE 322 STATION 028 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.28	0.17		32.502
7	0.24	0.25		32.503
21	0.26	0.15		32.504
40	0.27	0.18		32.504
10.38	7.50	WATER COLUMN VALUES		

MESSENGER TIME 1830 INCOMING SOLAR RADIATION - AM 308 PM 295

DEPTH	BROWN BEAR		CRUISE 322		STATION 028		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEO POT ANOMALY	POT ENERGY	UXY ML/L	E(O)	VAR RATIO	
0	9.34	0.00	32.520	0.000	25.15	282.7	0.000	0.00	7.24	0.00	0.98	
10	9.38	0.00	32.513	0.000	25.13	284.0	0.029	0.02	6.48	0.00		
20	9.37	0.00	32.520	0.000	25.14	283.5	0.058	0.06	6.51	0.00		
30	9.31	0.00	32.517	0.000	25.15	283.0	0.086	0.13	6.64	0.00		
50	9.25	0.01	32.506	0.002	25.15	283.3	0.143	0.37	6.70	0.01	0.91	
75	9.21	0.00	32.525	0.001	25.17	281.7	0.214	0.82	6.41	0.00	0.89	
100	8.39	0.02	32.733	0.001	25.46	254.4	0.282	1.43	6.11	0.00	0.89	
150	7.12	0.00	33.461	0.004	26.21	183.5	0.392	2.80	4.62	0.00	0.83	
200	6.93	0.01	33.844	0.006	26.54	153.2	0.477	4.30	4.13	0.12	9.71	
250	6.56	0.07	33.725	0.078	26.50	157.9	0.556	6.12	3.44*		73.31	

DOWN BEAR CRUISE 322 STATION 029 OBSERVED VALUES												
DATE 21/04/63	HR 07.7	LAT 46-15 N	LONG 129-01 W	SDNG 2651	WEA 02	WIND VEL 17 DIR 33						
BAROM 16.0	TEMP DRY 9.5	WET 7.8	RELHU 80	WIRCLR	SEA 2	DIR 33	SWELL 2	DIR 31				
CLOUD TYPE 0	AMT 2	VIS 7	WIRE ANGLE(S) --, 15									
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
2	0	9.61	32.547	25.12	7.74	0.691	-0.130		123	0.73	2.0	4
2	5	9.65	32.547	25.12	6.41	0.573	-0.012		102	0.68	1.5	3
2	10	9.66	32.549	25.12	6.33	0.565	-0.005		101	0.74	1.5	4
2	20		32.547	25.11	6.34	0.566	-0.006		101	0.78	1.7	4
2	29	9.62	32.545	25.12	6.93	0.619	-0.058		110	0.72	1.5	4
2	47	9.56	32.534	25.12	6.90	0.616	-0.054		110	0.75	1.5	3
2	72	9.57	32.538	25.12	7.67	0.685	-0.123		122	0.78	2.0	4
2	96	8.35	32.972	25.65	5.42	0.484	0.092		84	1.35	13.1	16
2	120	7.89	33.392	26.05	4.27	0.381	0.199		66	1.76	21.6	27
2	145	7.63	33.782	26.39	3.73	0.333	0.249		57	1.98	26.2	36
1	167	7.19	33.908	26.55	3.01	0.269	0.319		46	2.03	28.4	40
2	169	7.34	33.877	26.51	3.16	0.282	0.304		48	2.14	28.9	40
1	272	6.34	33.963	26.71	2.28	0.204	0.396		34	2.14	23.1	39
1	455	4.91	34.064	26.97	1.03	0.092	0.529		15	2.67	38.2	76
1	690	4.05	34.260	27.21	0.45	0.040	0.594		6	3.01	44.1	107
1	930	3.46	34.362	27.35	0.96	0.086	0.557		13	2.56	30.2	98
1	1412	2.55	34.504	27.55	0.65	0.058	0.599		9	3.06	40.1	117
1	1707	2.16	34.569	27.64	0.64	0.057	0.607		9	2.66	31.4	112

BROWN BEAR CRUISE 322 STATION 029 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.25	0.25		32.529
7	0.27	0.30		32.549
21	0.27	0.15		32.551
40	0.35	0.19		32.543

11.48 8.24 - WATER COLUMN VALUES

MESSENGER TIME 0030 INCOMING SOLAR RADIATION - AM 154 PM 163

ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0115-0125 DEPTHS 100, 70
35, 0

DEPTH	BROWN BEAR		CRUISE 322		STATION 029		INTERPOLATED AND COMPUTED VALUES						VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)			
0 10 20 30	9.61	0.00	32.547	0.000	25.12	284.8	0.000	0.00	7.74	0.00	0.98		
	9.66	0.00	32.549	0.000	25.12	285.6	0.029	0.02	6.33	0.00			
	9.67	0.00	32.547	0.000	25.11	286.1	0.058	0.06	6.34	0.00			
	9.62	0.00	32.544	0.000	25.12	285.6	0.087	0.13	6.94	0.02			
50 75 100 150	9.59	0.02	32.522	0.008	25.11	287.3	0.145	0.37	7.05	0.07	0.88		
	9.43	0.04	32.581	0.008	25.18	280.8	0.216	0.83	7.44	0.07	0.84		
	8.24	0.01	33.044	0.001	25.73	229.3	0.280	1.40	5.17	0.01	0.80		
	7.56	0.01	33.816	0.008	26.43	163.1	0.379	2.62	3.59	0.00	0.75		
200 250 300 400	6.86	0.11	33.964	0.039	26.64	143.4	0.456	4.00	2.59	0.19	1.62		
	6.44	0.06	33.986	0.027	26.72	137.0	0.527	5.63	2.26	0.13	1.03		
	6.09	0.00	33.979	0.002	26.76	133.6	0.595	7.56	2.05	0.01	0.90		
	5.28	0.01	34.035	0.004	26.90	120.7	0.724	12.14	1.35	0.01	0.72		
500 600 700 800	4.69	0.02	34.102	0.004	27.02	109.8	0.840	17.49	0.83	0.00	0.81		
	4.30	0.03	34.186	0.007	27.13	100.0	0.946	23.46	0.54	0.00	0.68		
	4.02	0.00	34.265	0.001	27.22	91.8	1.043	29.92	0.46	0.01	0.95		
	3.76	0.01	34.314	0.003	27.29	86.0	1.133	36.84	0.64	0.06	0.61		
1000 1200 1500	3.31	0.00	34.387	0.001	27.39	77.1	1.298	52.04	0.96	0.04	0.94		
	2.91	0.00	34.449	0.002	27.48	69.3	1.446	68.75	0.87	0.09	0.88		
	2.42	0.00	34.524	0.000	27.58	59.9	1.643	95.85	0.83	0.13	9.69		

BROWN BEAR CRUISE 322 STATION 29A BIOLOGICAL DATA

DATE 21/04/63 LAT 45-56 N LONG 129-18 W

DEPTH CHL-A PRODUCTIVITY SAL
LAB-I DECK-I

0 0.33 0.58 5.22 29.322

MESSAGE TIME 0455 INCOMING SOLAR RADIATION - AM 154 PM 163

BROWN BEAR CRUISE 322 STATION 030 OBSERVED VALUES
 DATE 21/04/63 HR 20.5 LAT 45-13 N LONG 129-30 W SNRG 2250 WEA WIND VEL 10 DIR 33
 BAROM 19.0 TEMP DRY VIS WET WIRE ANGLE(S) 17, 5 WTRCLR WTRCLR SECDI 22 SEA DIR 33 SWELL DIR 33
 CLOUD TYPE
 CST DEPTH TEMP SAL SIGMA-T ML/L MGA/L OXYGEN AUU SATN PHOS NITR SIL

2	0	9.31	32.516	25.15	6.62	0.591	-0.026	105	0.82	2.6	5
2	5	9.33	32.515	25.14	6.64	0.593	-0.028	105	0.73	1.5	3
2	10	9.35	32.513	25.14	6.81	0.608	-0.044	108	0.85	2.4	4
2	20	9.34	32.513	25.14	6.61	0.590	-0.026	105	0.89	2.8	5
2	30	9.30	32.514	25.15	7.19	0.642	-0.077	114	0.81	2.4	4
2	40	9.29	32.514	25.15	6.52	0.582	-0.017	103	0.79	2.0	4
2	74	9.30	32.535	25.16	6.52	0.582	-0.017	103	0.84	2.5	5
2	99	8.29	32.928	25.63	5.43	0.485	0.092	84	1.28	11.7	14
2	124	7.69	33.334	26.03	4.69	0.419	0.165	72	1.54	12.9	17
2	148	7.41	33.606	26.29	4.40	0.393	0.193	67	1.75	22.6	31
2	173	7.42	33.838	26.47	3.92	0.350	0.235	60	1.83	20.4	30
1	190	7.26	33.885	26.53	3.77	0.337	0.250	57	1.91	26.6	37
1	284	5.81	33.936	26.76	2.63	0.235	0.373	39	2.21	24.8	44
1	477	4.57	34.074	27.01	0.92	0.082	0.544	13	2.63	29.5	66
1	721	3.99	34.263	27.22	0.29	0.026	0.609	4	2.90	35.2	89
1	962	3.40	34.392	27.38	0.31	0.028	0.616	4	3.08	42.0	123
1	1452	2.39	34.528	27.58	0.71	0.063	0.597	10	2.93	38.2	133
1	2192	1.87	34.618	27.70	1.60	0.143	0.526	21	2.62	29.5	122

BROWN BEAR CRUISE 322 STATION 030					BIOLOGICAL DATA						
DEPTH	CHL-A	PRODUCTIVITY LAB-I	CRUISE 322	STATION 030	LIGHT PROD	SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	0.13	0.48	2.98		0.10	100		32.520	0.88	1.9	4
					0.09	66					
					0.11	49					
					0.06	35					
					0.02	16					
					0.00	5					
8	0.11	0.31	2.18				50	32.526	0.83	2.2	4
23	0.18	0.27	0.40				10	32.526	0.93	3.3	6
62	0.22	0.28	0.14				1	32.520	0.95	3.5	5
	10.90	18.22	50.28	-	WATER COLUMN VALUES						
MESSENGER TIME 1144		INCOMING SOLAR RADIATION - AM 154 PM 163									
LIGHT SATURATION INCUBATOR ILLUMINATION 19100											

DEPTH	BROWN BEAR		CRUISE 322		STATION 030		INTERPOLATED AND COMPUTED VALUES						VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)			
0 10 20 30	9.31	0.00	32.516	0.000	25.15	282.5	0.000	0.00	6.62	0.00	0.95 0.94 0.94 0.89		
	9.35	0.00	32.513	0.000	25.14	283.5	0.029	0.02	6.81	0.00			
	9.34	0.00	32.513	0.000	25.14	283.6	0.058	0.06	6.61	0.00			
	9.30	0.00	32.514	0.000	25.15	283.1	0.086	0.13	7.19	0.00			
50 75 100 150	9.30	0.01	32.511	0.002	25.15	283.6	0.143	0.37	6.52	0.01	0.95 0.94 0.94 0.89		
	9.27	0.01	32.547	0.002	25.18	280.9	0.214	0.82	6.48	0.01			
	8.26	0.00	32.945	0.001	25.65	236.9	0.280	1.40	5.39	0.00			
	7.41	0.01	33.629	0.002	26.30	175.0	0.383	2.69	4.36	0.01			
200 250 300 400	7.12	0.02	33.899	0.006	26.56	151.7	0.466	4.16	3.66	0.01	1.36 1.57 0.97 0.76		
	6.36	0.06	33.937	0.014	26.69	139.5	0.539	5.85	3.06	0.03			
	5.65	0.02	33.946	0.000	26.79	130.6	0.607	7.77	2.45	0.00			
	4.88	0.07	34.016	0.001	26.93	117.5	0.732	12.24	1.49	0.01			
500 600 700 800	4.49	0.02	34.093	0.001	27.04	108.2	0.846	17.48	0.81	0.02	0.89 0.68 0.88 0.66		
	4.21	0.05	34.172	0.003	27.13	100.0	0.951	23.41	0.45	0.04			
	4.02	0.01	34.248	0.001	27.21	93.1	1.049	29.91	0.30	0.01			
	3.79	0.00	34.311	0.001	27.28	86.7	1.140	36.91	0.25	0.02			
1000 1200 1500 2000	3.31	0.00	34.407	0.001	27.41	75.6	1.304	52.01	0.33	0.00	0.97 0.78 16.30 19.50		
	2.86	0.01	34.472	0.005	27.50	67.0	1.449	68.29	0.46	0.01			
	2.31	0.00	34.535	0.001	27.60	57.8	1.639	94.50	0.77	0.00			
	1.92	0.02	34.591	0.006	27.67	51.3	1.916	144.10	1.39	0.02			

BROWN BEAR CRUISE 322 STATION 031 OBSERVED VALUES

DATE 22/04/63 HR 04.7 LAT 44-14 N LONG 129-60 W WEA 02 WIND VEL 9 DIR 35
 BAROM 22.0 TEMP DRY . WET WTRCLR SECDI 2195 SWELL 1 DIR 31
 CLOUD TYPE 8 AMT 4 VIS 7 WIRE ANGLE(S) 5

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
1	0	9.90	32.600	25.12	6.54	0.584	-0.027	105	
1	5	9.90	32.598	25.12	6.53	0.583	-0.026	105	
1	10	9.95	32.588	25.10	6.69	0.598	-0.041	107	
1	19	9.96	32.602	25.11	6.51	0.581	-0.025	104	
1	29	9.91	32.592	25.11	6.89	0.615	-0.058	110	
1	48	9.87	32.594	25.12	6.44	0.575	-0.017	103	
1	73	9.84	32.600	25.13	6.42	0.573	-0.015	103	
1	99	8.96	32.792	25.42	6.01	0.537	0.032	94	
1	123	7.27	33.192	25.98	5.50	0.491	0.099	83	
1	148	7.14	33.568	26.29	4.80	0.429	0.161	73	
1	172	7.08	33.724	26.42	4.52	0.404	0.187	68	
1	196	6.89	33.825	26.53	4.20	0.375	0.217	63	
1	292	6.54	33.916	26.65	2.91	0.260	0.337	44	

BROWN BEAR CRUISE 322 STATION 031 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY	SAL
	LAB-I	DECK-I	
0	0.17	0.28	32.585
8	0.16	0.29	32.592
23	0.17	0.24	32.604
62	0.23	0.15	32.609

11.61 13.97 - WATER COLUMN VALUES

MESSANGER TIME 2105 INCOMING SOLAR RADIATION - AM 154 PM 163

DEPTH	BROWN BEAR		CRUISE 322		STATION 031		INTERPOLATED AND COMPUTED VALUES						VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)			
0	9.90	0.00	32.600	0.000	25.12	285.4	0.000	0.00	6.54	0.00	0.88 0.97		
10	9.95	0.00	32.588	0.000	25.10	287.3	0.029	0.02	6.69	0.00			
20	9.96	0.00	32.601	0.001	25.11	286.6	0.058	0.06	6.54	0.02			
30	9.91	0.00	32.592	0.000	25.11	286.7	0.087	0.13	6.88	0.02			
50	9.88	0.01	32.591	0.002	25.11	286.7	0.145	0.37	6.43	0.01	0.91		
75	9.81	0.00	32.607	0.001	25.14	284.8	0.217	0.83	6.40	0.00	0.90		
100	8.88	0.02	32.807	0.002	25.44	256.3	0.285	1.44	5.99	0.00	0.94		
150	7.14	0.00	33.586	0.002	26.31	174.5	0.394	2.78	4.77	0.01	0.88		
200	6.85	0.00	33.837	0.000	26.55	152.7	0.476	4.25	4.14	0.00	8.00		
250	6.69	0.05	33.913	0.008	26.63	145.7	0.551	5.98	3.43	0.01	66.65		

BROWN BEAR CRUISE 322 STATION 032 BIOLOGICAL DATA

DATE 21/04/63 LAT 43-58 N LONG 130-00 W

INCOMING SOLAR RADIATION -- AM 154 PM 163

ZOOPLANKTON (CLARKE-BUMPUS) HORIZ -- TIME 2305-2315 DEPTHS 100, 70
35, 0

BROWN BEAR CRUISE 322 STATION 32A BIOLOGICAL DATA

DATE 22/04/63 LAT 43-18 N LONG 130-00 W

DEPTH CHL-A LAB-I PRODUCTIVITY DECK-I SAL

0 0.38 1.27 8.78 32.662

MESSANGER TIME 0445 INCOMING SOLAR RADIATION - AM PM 286

BROWN BEAR CRUISE 322 STATION 033 OBSERVED VALUES

DATE 22/04/63 HR 14.3 LAT 43-10 N LONG 130-00 W SNOG 3255 WEA 02 WIND VEL 5 DIR 31
 BAROM 25.0 TEMP DRY 9.9 WET 6.8 RELHU 61 WTRCLR SECDI 16 SEA 1 DIR 31 SWELL 1 DIR 31
 CLOUD TYPE 8 AMT 7 VIS 7 WIRE ANGLE(S) 7, 8

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	ADU	SATN
2	0	10.43	32.675	25.09	6.50	0.581	-0.030	105	
2	5	10.45	32.670	25.08	6.63	0.592	-0.042	108	
2	10	10.47	32.660	25.07	6.47	0.578	-0.028	105	
2	20	10.49	32.670	25.07	6.46	0.577	-0.027	105	
2	30	10.45	32.670	25.08	6.47	0.578	-0.028	105	
2	49	10.44	32.676	25.09	6.44	0.575	-0.025	105	
2	74	10.40	32.676	25.09	6.64	0.593	-0.042	108	
2	99	8.45	32.920	25.60	6.18	0.552	0.023	96	
2	124	7.73	33.317	26.01	5.12	0.457	0.126	78	
2	148	7.70	33.602	26.24	4.45	0.397	0.185	68	
2	173	7.64	33.796	26.40	4.02	0.359	0.224	62	
1	201	7.52	33.868	26.48	3.80	0.339	0.244	58	
1	298	6.01	33.942	26.47	2.78	0.248	0.357	41	
1	496	4.69	34.075	27.00	0.95	0.085	0.540	14	
1	743	3.87	34.269	27.24	0.35	0.031	0.605	5	
1	988	3.44	34.406	27.39	0.28	0.025	0.618	4	
1	1482	2.50	34.532	27.58	0.77	0.069	0.589	10	
1	1778	2.09	34.583	27.65	1.34	0.120	0.550	18	

BROWN BEAR CRUISE 322 STATION 033 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.36	0.69		32.685
8	0.37	0.61		32.681
23	0.45	0.62		32.679
62	0.41	0.39		32.685

26.02 34.18 - WATER COLUMN VALUES

MESSANGER TIME 0650 INCOMING SOLAR RADIATION - AM PM 286

BROWN BEAR			CRUISE 322			STATION 033			INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	DX ML/L	E(O)	VAR RATIO		
0	10.43	0.00	32.675	0.000	25.09	288.3	0.000	0.00	5.50	0.00			
10	10.47	0.00	32.660	0.000	25.07	290.3	0.030	0.02	5.47	0.00			
20	10.49	0.00	32.670	0.000	25.07	290.1	0.059	0.06	5.46	0.00			
30	10.45	0.00	32.670	0.000	25.08	289.6	0.088	0.14	5.47	0.00			
50	10.46	0.01	32.674	0.002	25.08	289.9	0.146	0.38	6.45	0.01	0.95		
75	10.33	0.02	32.682	0.001	25.11	287.6	0.219	0.84	6.63	0.00	0.94		
100	8.40	0.00	33.935	0.002	25.62	239.7	0.286	1.43	6.14	0.01	0.94		
150	7.70	0.00	33.622	0.000	26.26	179.5	0.391	2.75	4.41	0.00	0.89		
200	7.53	0.00	33.867	0.001	26.47	159.7	0.477	4.27	3.81	0.00	0.92		
250	6.83	0.09	33.923	0.011	26.62	146.8	0.554	6.05	3.30	0.02	1.12		
300	5.99	0.00	33.943	0.000	26.74	135.0	0.625	8.05	2.76	0.00	1.00		
400	5.15	0.07	34.011	0.002	26.90	120.9	0.754	12.66	1.74	0.04	0.78		
500	4.67	0.00	34.078	0.000	27.00	111.4	0.871	18.06	0.93	0.00	0.98		
600	4.27	0.02	34.158	0.004	27.11	101.7	0.979	24.12	0.55	0.05	0.69		
700	3.97	0.01	34.236	0.002	27.20	93.4	1.077	30.68	0.37	0.03	0.79		
800	3.75	0.01	34.306	0.000	27.28	86.7	1.169	37.69	0.30	0.01	0.74		
1000	3.42	0.00	34.411	0.001	27.40	76.6	1.334	52.88	0.28	0.00	0.99		
1200	3.02	0.02	34.476	0.006	27.49	68.7	1.481	69.46	0.40	0.01	0.90		
1500	2.47	0.00	34.535	0.000	27.58	59.7	1.676	96.40	0.80	0.00	12.71		

BROWN BEAR CRUISE 322 STATION 034 BIOLOGICAL DATA

DATE 22/04/63 LAT 43-26 N LONG 129-31 W

DEPTH	CHL-A	PRODUCTIVITY LAB-1	DECK-1	LIGHT PROD	SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	0.35	0.63	3.66	0.72	100	50	32.570	0.80	2.1	1
6	0.40	0.50	3.68	0.60	66		32.578	0.73	1.6	1
				0.38	49					
				0.36	35					
				0.30	16					
				0.15	5					
26	0.49	0.87	0.38			10	32.577	0.79	2.1	1
48	0.61	0.60	0.00			1	32.580	0.84	2.1	2

23.13 33.14 66.26 - WATER COLUMN VALUES

MESSENGER TIME 1135 INCOMING SOLAR RADIATION - AM PM 286

LIGHT SATURATION INCUBATOR ILLUMINATION 19200

BROWN BEAR CRUISE 322 STATION 035 OBSERVED VALUES
 DATE 22/04/63 HR 23.8 LAT 43-45 N LONG 128-59 W SNDG 3018 WEA WIND VEL 5 DIR 34
 BAROM 28.0 TEMP DRY 10.7 WET 8.3 RELHU 69 WTRCLR SECDI 15 SEA DIR SWELL DIR
 CLOUD TYPE 8 AMT VIS WIRE ANGLE(S) 6
 CST DEPTH TEMP SAL SIGMA-T ML/L MGA/L OXYGEN ML/L AOU SATN
 1 1 0 11.23 32.777 25.03 6.47 0.578 -0.037 107
 1 1 5 11.12 32.780 25.05 6.53 0.583 -0.042 108
 1 1 10 10.96 32.771 25.07 6.66 0.595 -0.051 109
 1 1 20 10.94 32.781 25.08 6.45 0.576 -0.032 106
 1 1 30 10.87 32.773 25.09 6.35 0.567 -0.022 104
 1 1 49 10.87 32.774 25.09 6.28 0.561 -0.016 103
 1 1 74 10.78 32.784 25.11 6.22 0.556 -0.010 102
 1 1 99 9.02 33.364 25.86 4.44 0.397 0.169 70
 1 1 124 8.24 33.685 26.23 3.75 0.335 0.240 58
 1 1 149 7.90 33.854 26.41 3.33 0.297 0.281 51
 1 1 174 7.66 33.939 26.51 2.82 0.252 0.329 43
 1 1 199 7.23 33.961 26.59 2.76 0.247 0.341 42
 1 1 296 6.17 34.040 26.79 1.65 0.147 0.455 24

BROWN BEAR CRUISE 322 STATION 035 BIOLOGICAL DATA
 DEPTH CHL-A PRODUCTIVITY LAB-I DECK-I SAL
 0 0.56 32.789
 6 0.69 32.794
 26 0.95 32.786
 48 0.96 32.792
 33.35 29.38 - WATER COLUMN VALUES
 MESSENGER TIME 1602 INCOMING SOLAR RADIATION - AM PM 286
 ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0050-0100 DEPTHS 100, 70
 0125-0135 35, 0

DEPTH	BROWN BEAR		CRUISE 322		STATION 035		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	11.23	0.00	32.777	0.000	25.03	294.1	0.000	0.00	6.47	0.00		
10	10.96	0.00	32.771	0.000	25.07	290.2	0.030	0.02	6.66	0.00		
20	10.94	0.00	32.781	0.000	25.08	289.4	0.059	0.06	6.45	0.00		
30	10.87	0.00	32.773	0.000	25.09	289.0	0.088	0.14	6.35	0.00		
50	10.88	0.01	32.769	0.004	25.08	289.9	0.147	0.37	6.29	0.01	0.95	
75	10.72	0.02	32.804	0.005	25.14	285.0	0.219	0.84	6.15	0.02	0.94	
100	8.98	0.00	33.381	0.001	25.88	215.1	0.282	1.39	4.40	0.01	0.94	
150	7.89	0.00	33.859	0.000	26.42	164.6	0.378	2.59	3.31	0.00	0.94	
200	7.21	0.00	33.961	0.000	26.59	148.4	0.457	4.00	2.57	0.12	5.63	
250	6.31	0.08	34.033	0.020	26.77	131.7	0.527	5.62	2.09	0.17	61.26	

BROWN BEAR CRUISE 322 STATION 036 OBSERVED VALUES												
DATE 22/04/63		HR 06.9	LAT 44-15 N	LONG 128-00 W	SNDG 2697	WEA 02	WIND VEL 5 DIR 35					
BAROM 27.0		TEMP DRY 10.6	WET 7.8	RELHU 68	WTRCLR	SEA 1 DIR 35	SWELL 1 DIR 11					
CLOUD TYPE 0		AMT 2	VIS 8	WIRE ANGLE(S) ---, 6								
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
2	0	10.37	32.624	25.55						0.78	1.7	2
2	5	10.37	32.626	25.06						0.72	1.1	2
2	10	10.42	32.628	25.05						0.79	0.9	4
2	20	10.38	32.638	25.07						0.78	1.0	2
2	30	10.28	32.641	25.09	6.47	0.578	-0.025		105	0.65	0.9	2
2	49	10.29	32.640	25.08	6.40	0.572	-0.019		104	0.62	1.2	1
2	74	10.33	32.742	25.16	6.15	0.549	-0.002		100	0.83	2.5	4
2	99	8.86	33.230	25.78	4.73	0.422	0.146		74	1.51	15.2	18
2	124	8.45	33.589	26.12	4.22	0.377	0.195		66	1.79	17.1	21
2	148	8.33	33.765	26.28	3.08*	0.275	0.298		48	2.06	27.1	32
2	172	7.98	33.876	26.41	3.45	0.308	0.269		53	2.14	24.2	31
1	197	7.67	33.937	26.51						2.62	29.2	37
1	294	6.49	33.994	26.72						2.46	33.6	53
1	489	5.09	34.117	26.99						2.96	41.5	80
1	735	4.28	34.294	27.22						3.08	38.0	92
1	980	3.54	34.395	27.37	0.32	0.029	0.613	4		3.17	43.8	121
1	1474	2.60	34.516	27.56	0.76	0.068	0.589	10		3.11	44.2	138
1	1770	2.09	34.574	27.65	1.29	0.115	0.550	17		2.98	44.3	151

BROWN BEAR CRUISE 322 STATION 036 BIOLOGICAL DATA
 DATE 22/04/63 LAT 44-14 N LONG 128-00 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.39	0.53		32.615
6	0.44	0.48		32.616
26	0.77	0.51		32.644
48	0.22	0.50		32.634

25.53 24.07 - WATER COLUMN VALUES
 MESSENGER TIME 2350 INCOMING SOLAR RADIATION - AM PM 286

DEPTH	BROWN BEAR		CRUISE 322		STATION 036		INTERPOLATED AND COMPUTED VALUES					VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)		
0 10 20 30	10.37	0.00	32.624	0.000	25.06	291.1	0.000	0.00				
	10.42	0.00	32.628	0.000	25.05	291.9	0.030	0.02				
	10.38	0.00	32.638	0.000	25.07	290.7	0.059	0.06				
	10.28	0.00	32.641	0.000	25.09	289.0	0.088	0.14	6.47	0.00		
50 75 100 150	10.31	0.01	32.639	0.002	25.08	289.9	0.147	0.38	6.40	0.01	0.95	
	10.28	0.02	32.759	0.003	25.18	281.1	0.219	0.84	6.10	0.01	0.94	
	8.83	0.00	33.147	0.000	25.79	222.8	0.282	1.40	4.70	0.01	0.95	
	8.30	0.00	33.776	0.000	26.29	176.7	0.383	2.66	3.78	0.01	0.89	
200 250 300 400	7.63	0.00	33.941	0.001	26.52	155.7	0.467	4.15	3.15	0.08	1.60	
	7.00	0.01	33.986	0.012	26.64	144.5	0.542	5.89	2.64	0.20	3.09	
	6.43	0.00	33.998	0.000	26.73	136.7	0.613	7.89	2.18	0.31	4.86	
	5.61	0.03	34.059	0.000	26.88	122.9	0.744	12.57	1.48#		8.29	
500 600 700 800	5.04	0.01	34.125	0.001	27.00	112.2	0.863	18.03	0.93#		10.42	
	4.65	0.04	34.200	0.004	27.10	103.1	0.971	24.16	0.57#		10.51	
	4.36	0.02	34.270	0.002	27.19	95.4	1.072	30.84	0.35#		8.55	
	4.07	0.00	34.326	0.002	27.26	88.8	1.165	38.01	0.28#		5.25	
1000 1200 1500	3.49	0.00	34.401	0.001	27.38	78.2	1.334	53.54	0.32	0.01	0.98	
	3.07	0.03	34.458	0.003	27.47	70.5	1.484	70.52	0.37	0.05	0.90	
	2.56	0.00	34.521	0.000	27.56	61.7	1.686	98.29	0.80	0.00	12.46	

BROWN BEAR CRUISE 322 STATION 037 OBSERVED VALUES
 DATE 23/04/63 HR 11.1 LAT 44-14 N LONG 127-46 W SNDC 2761 WEA SEA
 BAROM 27.0 TEMP DRY 10.8 WET 7.7 RELHU 68 WTRCLR DIR WIND VEL 6 DIR 32
 CLOUD TYPE VIS WIRE ANGLE(S) 0
 CST DEPTH TEMP SAL SIGMA-T ML/L OXYGEN MGA/L AOU SATN
 1 0 10.28 32.638 25.08 6.50 0.581 -0.028 105
 1 5 10.32 32.630 25.07 6.57 0.587 -0.035 106
 1 10 10.35 32.629 25.07 6.54 0.584 -0.033 106
 1 20 10.35 32.628 25.06 6.52 0.582 -0.031 106
 1 30 10.29 32.626 25.07 6.48 0.579 -0.026 105
 1 49 10.25 32.628 25.08 6.42 0.573 -0.021 104
 1 74 10.18 32.627 25.09 6.38 0.570 -0.016 103
 1 99 8.86 32.944 25.55 5.52 0.493 0.076 87
 1 124 7.61 33.397 26.09 4.93 0.440 0.144 75
 1 148 7.88 33.634 26.24 4.29 0.383 0.196 66
 1 173 7.74 33.753 26.35 4.16 0.372 0.210 64
 1 198 7.45 33.898 26.51 3.70 0.330 0.254 57
 1 296 6.38 33.973 26.71 2.50 0.223 0.376 37

BROWN BEAR CRUISE 322 STATION 037 INTERPOLATED AND COMPUTED VALUES
 DEPTH TEMP E(T) SAL E(S) SIGMA-T SP VOL ANOMALY GEOPT ANOMALY POT ENERGY OXY ML/L VAR RATIO
 0 10.28 0.00 32.638 0.000 25.08 288.7 0.000 0.00 0.00 6.50 0.00
 10 10.35 0.00 32.629 0.000 25.07 290.6 0.030 0.02 0.00 6.54 0.00
 20 10.35 0.00 32.628 0.000 25.06 290.9 0.059 0.06 0.00 6.52 0.00
 30 10.29 0.00 32.626 0.000 25.07 290.3 0.088 0.14 0.00 6.45 0.00
 50 10.26 0.01 32.625 0.002 25.08 290.2 0.147 0.38 0.01 6.43 0.01
 75 10.14 0.01 32.635 0.001 25.11 288.0 0.220 0.84 0.01 6.35 0.01
 100 8.79 0.01 32.963 0.002 25.58 243.4 0.286 1.44 0.00 5.49 0.00
 150 7.88 0.00 33.645 0.002 26.25 180.3 0.393 2.77 0.01 4.28 0.01
 200 7.42 0.00 33.910 0.001 26.52 155.1 0.478 4.27 0.00 3.65 0.00
 250 6.71 0.05 33.999 0.025 26.69 139.6 0.552 5.98 0.13 2.55 0.13

DATE 23/04/63 HR 14.0 LAT 44-15 N LONG 127-32 W WIND VEL 3 DIR 33
 BAROM 26.0 TEMP DRY 9.2 WET 6.9 RELHU 67 WTRCLR SEA 1 DIR 33 SWELL 1 DIR 09
 CLOUD TYPE 4 AMT 2 VIS WIRE ANGLE(S) 10, 4

BROWN BEAR				CRUISE 322				STATION 038				OBSERVED VALUES			
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	SDG 2834	WEA 02	WIND VEL 3	DIR 33		
2	0	10.57	32.694	25.08	6.57	0.587	-0.038	107							
2	5	10.58	32.691	25.07	6.42	0.573	-0.025	105							
2	10	10.61	32.686	25.07	6.44	0.575	-0.027	105							
2	19	10.62	32.688	25.06	6.62	0.591	-0.043	108							
2	28	10.54	32.692	25.08	6.40	0.572	-0.023	104							
2	47	10.53	32.697	25.09	6.50	0.581	-0.031	106							
2	71	10.48	32.697	25.10	6.25	0.558	-0.009	102							
2	95	8.45	32.891	25.57	5.60	0.500	0.075	87							
2	119	7.22	33.143	25.95	5.42	0.484	0.107	82							
2	143	7.37	33.464	26.18	4.78	0.427	0.160	73							
2	168	7.65	33.826	26.42	3.51	0.313	0.269	54							
1	195	7.27	33.910	26.54	3.52	0.314	0.272	54							
1	292	6.23	33.994	26.75	1.97	0.176	0.425	29							
1	486	4.98	34.096	26.98	0.85	0.076	0.544	12							
1	730	4.02	34.288	27.24	0.27	0.024	0.610	4							
1	975	3.54	34.424	27.40	0.35	0.031	0.610	5							
1	1467	2.59	34.517	27.56	0.68	0.061	0.596	9							
1	1764	2.14	34.576	27.64	1.22	0.109	0.555	16							

BROWN BEAR CRUISE 322 STATION 038 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.44	0.68	5.12	32.689
6	0.46	0.72		32.693
26	0.48	0.59		32.696
48	0.46	0.51		32.694

22.46 29.40 - WATER COLUMN VALUES

MESSANGER TIME 0535 INCOMING SOLAR RADIATION - AM 241 PM 167

BROWN BEAR			CRUISE 322			STATION 038		INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	10.57	0.00	32.694	0.000	25.08	289.2	0.000	0.00	6.57	0.00		
10	10.61	0.00	32.686	0.000	25.07	290.7	0.030	0.02	6.44	0.00		
20	10.61	0.00	32.688	0.000	25.07	290.7	0.059	0.06	6.60	0.01	0.86	
30	10.53	0.00	32.693	0.000	25.08	289.3	0.088	0.14	6.40	0.02	0.96	
50	10.58	0.04	32.692	0.004	25.07	290.5	0.147	0.38	6.49	0.00	0.86	
75	10.18	0.06	32.721	0.003	25.16	282.4	0.219	0.84	6.14	0.02	0.80	
100	8.10	0.02	32.938	0.000	25.66	235.2	0.284	1.42	5.56	0.03	0.76	
150	7.47	0.02	33.578	0.010	26.26	179.6	0.388	2.72	4.39	0.06	0.71	
200	7.21	0.00	33.919	0.003	26.56	151.4	0.472	4.20	3.46	0.03	1.06	
250	6.63	0.01	33.980	0.013	26.69	139.9	0.545	5.89	2.75	0.13	1.10	
300	6.16	0.00	33.999	0.001	26.76	133.1	0.614	7.84	1.89	0.01	0.98	
400	5.44	0.03	34.053	0.005	26.90	121.3	0.743	12.42	1.15	0.08	0.76	
500	4.91	0.00	34.107	0.001	27.00	112.0	0.860	17.84	0.80	0.00	0.93	
600	4.46	0.01	34.185	0.005	27.11	101.9	0.968	23.93	0.48	0.01	0.68	
700	4.11	0.00	34.264	0.002	27.21	92.9	1.067	30.49	0.30	0.00	0.84	
800	3.86	0.02	34.333	0.000	27.29	85.8	1.157	37.44	0.26	0.02	0.70	
1000	3.49	0.00	34.432	0.002	27.41	75.9	1.321	52.49	0.36	0.00	0.97	
1200	3.09	0.01	34.481	0.010	27.48	69.0	1.468	69.04	0.44	0.02	0.89	
1500	2.53	0.00	34.521	0.001	27.57	61.4	1.666	96.46	0.72	0.00	12.16	

BROWN BEAR CRUISE 322 STATION 039 OBSERVED VALUES

DATE 23/04/63 HR 13.0 LAT 44-14 N LONG 127-16 W SNGD 2834 WEA 02 WIND VEL 5 DIR 31
 BAROM 26.0 TEMP DRY 10.3 WET 7.2 RELHU 62 WTRCLR SECDI SEA 1 DIR 31 SWELL 1 DIR 30
 CLOUD TYPE 3 AMT 4 VIS 7 WIRE ANGLE(S) ---

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	ADU	SATN
1	0	10.52	32.694	25.09	6.54	0.584	-0.035	106	
1	5	10.56	32.691	25.08	6.54	0.584	-0.035	106	
1	10	10.58	32.685	25.07	6.51	0.581	-0.033	106	
1	20	10.61	32.686	25.07	6.54	0.584	-0.036	107	
1	30	10.53	32.684	25.08	6.62	0.591	-0.042	108	
1	49	10.51	32.690	25.09	6.83	0.610	-0.061	111	
1	74	10.48	32.693	25.09	6.25	0.558	-0.008	102	
1	99	7.81	32.954	25.72	5.68	0.507	0.076	87	
1	124	7.88	33.440	26.09	4.65	0.415	0.165	72	
1	147	7.76	33.792	26.38	3.74	0.334	0.247	58	
1	173	7.72	33.914	26.48	3.19	0.285	0.296	49	
1	197	7.35	33.951	26.57	2.80	0.250	0.336	43	
1	293	5.97	33.968	26.76	2.46	0.220	0.386	36	

BROWN BEAR			CRUISE 322			STATION 039			INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO		
0	10.52	0.00	32.694	0.000	25.09	288.4	0.000	0.00	6.54	0.00			
10	10.58	0.00	32.685	0.000	25.07	290.3	0.030	0.02	6.51	0.00			
20	10.61	0.00	32.686	0.000	25.07	290.9	0.059	0.06	6.54	0.00			
30	10.53	0.00	32.684	0.000	25.08	289.9	0.088	0.14	6.62	0.00			
50	10.53	0.02	32.688	0.002	25.08	290.1	0.147	0.38	6.82	0.01	0.95		
75	10.37	0.03	32.699	0.000	25.12	287.1	0.219	0.84	6.23	0.00	0.94		
100	7.79	0.02	32.972	0.002	25.74	228.2	0.284	1.42	5.64	0.00	0.94		
150	7.76	0.01	33.816	0.004	26.40	166.0	0.384	2.65	3.66	0.01	0.86		
200	7.29	0.00	33.952	0.001	26.57	150.1	0.463	4.07	2.76	0.00	6.48		
250	6.22	0.11	34.016	0.020	26.77	132.0	0.534	5.70	2.38	0.00	57.86		

BROWN BEAR CRUISE 322 STATION 040 OBSERVED VALUES
 DATE 23/04/63 HR 17.3 LAT 44-15 N LONG 127-04 W SNDC 2834 WEA 02 WIND VEL 3 DIR 31
 BAROM 25.0 TEMP DRY 10.6 WET 7.8 RELHU 68 WTRCLR SECDI 16 SEA 1 DIR 31 SWELL 1 DIR 31
 CLOUD TYPE 3 AMT 5 VIS 7 WIRE ANGLE(S) 5, 5

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN
2	0	10.32	32.614	25.06	6.85	0.612	-0.060	111
2	5	10.28	32.613	25.06	7.20	0.643	-0.091	116
2	10	10.22	32.604	25.07	6.71	0.599	-0.046	108
2	20	10.19	32.593	25.06	6.71	0.599	-0.046	108
2	30	10.07	32.582	25.08	6.48	0.579	-0.024	104
2	50	10.04	32.584	25.08	6.62	0.591	-0.036	106
2	74	9.99	32.586	25.09	6.54	0.584	-0.028	105
2	99	8.32	33.041	25.71	5.51	0.492	0.084	85
2	123	8.35	33.538	26.10	4.27	0.381	0.192	66
2	148	8.15	33.812	26.34	3.48	0.311	0.264	54
2	170	7.82	33.818	26.39	2.88	0.257	0.322	44
1	197	7.53	33.966	26.55	2.67	0.238	0.345	41
1	293	6.12	33.957	26.74	2.56	0.229	0.375	38
1	487	5.12	34.139	27.00	0.74	0.066	0.551	11
1	734	4.09	34.282	27.23	1.09*	0.097	0.536	15
1	976	3.59	34.426	27.39				
1	1464	2.59	34.530	27.57	1.90*	0.170	0.487	26
1	1759	2.13	34.570	27.64	1.16	0.104	0.561	16

BROWN BEAR CRUISE 322 STATION 040 BIOLOGICAL DATA										
DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	LIGHT PROD	SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	0.39	0.41	8.22				32.624	0.74	1.3	2
7		0.66	4.86			50	32.620	0.79	1.7	2
22	0.52	0.53	1.30	0.88	100	10	32.632	0.79	1.7	2
				0.88	66					
				0.80	49					
				0.62	32					
				0.34	16					
				0.09	5					
50	0.34	0.43	0.00			1	32.614	0.77	1.8	3

22.05 26.00 110.18 - WATER COLUMN VALUES

MESSANGER TIME 1131 INCOMING SOLAR RADIATION - AM 241 PM 167

LIGHT SATURATION INCUBATOR ILLUMINATION 19200

DEPTH	BROWN BEAR		CRUISE 322		STATION 040		INTERPOLATED AND COMPUTED VALUES					VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)		
0	10.32	0.00	32.614	0.000	25.06	291.1	0.000	0.00	6.85	0.00		
10	10.22	0.00	32.604	0.000	25.07	290.4	0.030	0.02	6.71	0.00		
20	10.19	0.00	32.593	0.000	25.06	290.9	0.059	0.06	6.71	0.00		
30	10.07	0.00	32.582	0.000	25.08	290.0	0.088	0.14	6.48	0.00		
50	10.04	0.00	32.584	0.000	25.08	289.8	0.147	0.38	6.62	0.00		
75	9.92	0.02	32.599	0.003	25.11	287.2	0.219	0.84	6.51	0.00	0.94	
100	8.31	0.01	33.063	0.002	25.73	228.3	0.284	1.42	5.46	0.00	0.94	
150	8.12	0.00	33.815	0.004	26.35	171.2	0.385	2.67	3.42	0.00	0.87	
200	7.49	0.01	33.972	0.005	26.56	151.4	0.466	4.12	2.66	0.01	1.04	
250	6.75	0.05	34.009	0.037	26.69	139.4	0.540	5.81	2.58	0.06	1.10	
300	6.06	0.01	33.962	0.002	26.75	134.6	0.609	7.76	2.51	0.02	0.99	
400	5.41	0.10	34.045	0.014	26.89	121.5	0.738	12.37	1.66	0.11	0.76	
500	5.06	0.00	34.148	0.001	27.02	110.7	0.855	17.77	1.48	0.56	2.81	
600	4.60	0.01	34.210	0.004	27.12	101.7	0.963	23.81	1.07	0.77	4.01	
700	4.21	0.00	34.265	0.002	27.20	94.0	1.061	30.40	0.72	0.93	5.15	
800	3.93	0.02	34.324	0.002	27.28	87.3	1.153	37.45	0.44	1.05	6.07	
1000	3.54	0.00	34.435	0.002	27.41	76.2	1.318	52.66			6.87	
1200	3.11	0.01	34.492	0.008	27.49	68.5	1.465	69.17			6.06	
1500	2.53	0.00	34.534	0.001	27.58	60.4	1.661	96.25			12.13	

BROWN BEAR CRUISE 322 STATION 041 OBSERVED VALUES
 DATE 23/04/63 HR 21.1 LAT 44-14 N LONG 126-50 W SNGD 2834 WEA WIND VEL 9 DIR 21
 BAROM 24.0 TEMP DRY 12.7 WET 9.4 RELHU 65 WTRCLR SEA DIR 22 SWELL DIR 22
 CLOUD TYPE VIS WIRE ANGLE(S) 7

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	ADU	SATN
1	0	10.65	32.675	25.05	6.69	0.598	-0.050	109	
1	5	10.66	32.677	25.05	7.45	0.665	-0.118	122	
1	10	10.48	32.670	25.08	7.22	0.645	-0.095	117	
1	20	10.49	32.681	25.08	6.85	0.612	-0.062	111	
1	30	10.42	32.663	25.08	6.48	0.579	-0.028	105	
1	49	10.30	32.663	25.10	6.37	0.569	-0.017	103	
1	74	10.18	32.654	25.11	6.47	0.578	-0.024	104	
1	99	9.16	33.104	25.63	5.21	0.465	0.099	82	
1	124	8.38	33.489	26.05	4.26	0.380	0.193	66	
1	147	7.89	33.649	26.25	4.04	0.361	0.219	62	
1	172	7.80	33.784	26.37	3.39	0.303	0.277	52	
1	196	7.59	33.922	26.51	3.32	0.297	0.286	51	
1	292	6.21	33.958	26.72	2.78	0.248	0.354	41	

INTERPOLATED AND COMPUTED VALUES									
BROWN BEAR		CRUISE 322		STATION 041					
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	VAR RATIO
0	10.65	0.00	32.675	0.000	25.05	292.0	0.000	0.00	
10	10.48	0.00	32.670	0.000	25.08	289.7	0.030	0.02	
20	10.49	0.00	32.681	0.000	25.08	289.3	0.059	0.06	
30	10.42	0.00	32.663	0.000	25.08	289.7	0.088	0.14	
50	10.30	0.01	32.658	0.003	25.10	288.5	0.146	0.37	0.95
75	10.15	0.01	32.668	0.003	25.13	285.7	0.219	0.84	0.94
100	9.12	0.00	33.122	0.001	25.65	236.5	0.284	1.42	0.94
150	7.87	0.01	33.666	0.001	26.27	178.6	0.389	2.73	0.85
200	7.55	0.00	33.944	0.001	26.53	154.3	0.473	4.22	7.59
250	6.85	0.02	34.015	0.019	26.69	140.2	0.547	5.93	61.91

DATE 23/04/63
 BAROM
 CLOUD TYPE

BROWN BEAR
 HR 22.9
 TEMP DRY 11.6
 VIS

CRUISE 322
 LAT 44-14 N
 WET 8.8
 WIRE ANGLE(S) 15, 7

STATION 042
 LONG 126-35 W
 RELHU 64
 WTRCLR

OBSERVED VALUES
 SNRG 2789
 SECDI 13
 WEA
 WIND VEL 0 DIR
 SWELL
 DIR

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	ADU	SATN
2	0	10.73	32.677	25.04	6.56	0.586	-0.039	107
2	5	10.75	32.678	25.03	6.51	0.581	-0.035	106
2	10	10.72	32.672	25.04	6.52	0.582	-0.035	106
2	20	10.55	32.653	25.05	6.55	0.585	-0.036	107
2	30	10.47	32.653	25.06	6.43	0.574	-0.024	104
2	49	10.44	32.667	25.08	6.31	0.564	-0.013	102
2	74	10.43	32.697	25.10	6.19	0.553	-0.003	100
2	99	8.25	33.066	25.74	5.22	0.466	0.111	81
2	124	8.62	33.658	26.15	3.48	0.311	0.259	55
2	149	8.42	33.850	26.33	2.80	0.250	0.321	44
2	173	8.05	33.916	26.44	2.61	0.233	0.343	40
1	190	7.56	33.944	26.53	2.61	0.233	0.350	40
1	282	6.37	33.972	26.72	2.32	0.207	0.392	35
1	470	4.97	34.068	26.96	1.08	0.096	0.524	16
1	704	4.20	34.286	27.22	0.02	0.002	0.629	0
1	940	3.65	34.398	27.36	0.30	0.027	0.613	4
1	1412	2.62	34.508	27.55	0.83	0.074	0.582	11
1	1696	2.17	34.562	27.63	1.12	0.100	0.564	15

BROWN BEAR CRUISE 322 STATION 042 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	SAL DECK-I
0	0.43	0.75	32.689
7	0.47	0.76	32.680
22	0.63	0.55	32.667
50	0.15		33.088

22.24 22.81 - WATER COLUMN VALUES

MESSANGER TIME 1525 INCOMING SOLAR RADIATION - AM 241 PM 167

BROWN BEAR			CRUISE 322			STATION 042			INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VCL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO		
0	10.73	0.00	32.677	0.000	25.04	293.1	0.000	0.00	6.56	0.00			
10	10.72	0.00	32.672	0.000	25.04	293.5	0.030	0.02	6.52	0.00			
20	10.55	0.00	32.653	0.000	25.05	292.3	0.060	0.06	6.55	0.00			
30	10.47	0.00	32.653	0.000	25.06	291.2	0.089	0.14	6.43	0.00			
50	10.46	0.01	32.665	0.002	25.07	290.6	0.148	0.38	6.31	0.01	0.95		
75	10.34	0.03	32.706	0.001	25.13	286.0	0.220	0.84	6.17	0.00	0.94		
100	8.25	0.02	33.091	0.004	25.76	225.8	0.285	1.41	5.15	0.01	0.94		
150	8.41	0.00	33.854	0.001	26.33	172.5	0.385	2.67	2.79	0.00	0.94		
200	7.36	0.03	33.952	0.004	26.56	151.1	0.467	4.12	2.60	0.00	1.35		
250	6.63	0.08	33.973	0.008	26.68	140.3	0.540	5.81	2.46	0.01	1.50		
300	6.19	0.01	33.979	0.000	26.74	135.0	0.609	7.77	2.21	0.02	0.96		
400	5.37	0.03	34.025	0.001	26.88	122.5	0.739	12.41	1.57	0.05	0.75		
500	4.83	0.02	34.096	0.004	27.00	112.0	0.858	17.86	0.89	0.01	0.86		
600	4.46	0.04	34.189	0.009	27.11	101.7	0.966	23.93	0.38	0.03	0.67		
700	4.21	0.00	34.282	0.001	27.22	92.7	1.064	30.47	0.03	0.00	0.97		
800	3.96	0.01	34.340	0.003	27.29	86.4	1.154	37.45	0.05	0.05	0.62		
1000	3.51	0.00	34.417	0.002	27.39	77.1	1.320	52.68	0.37	0.00	0.94		
1200	3.06	0.01	34.470	0.005	27.48	69.5	1.468	69.42	0.60	0.00	0.88		
1500	2.46	0.00	34.523	0.001	27.57	60.4	1.666	96.70	0.92	0.00	9.34		

BROWN BEAR CRUISE 322 STATION 043 OBSERVED VALUES
 DATE 24/04/63 HR 01.0 LAT 44-14 N LONG 126-23 W SNDG 2889 WEA 02 WIND VEL 10 DIR 26
 BAROM 12.0 TEMP DRY 10.7 WET 8.3 RELHU 75 WTRCLR SEA 2 DIR 26 SWELL 1 DIR 31
 CLOUD TYPE 8 AMT 7 VIS 8 WIRE ANGLE(S) 10

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
1	0	10.36	32.580	25.03	6.43	0.574	-0.023	104	
1	5	10.40	32.578	25.02	6.59	0.589	-0.037	107	
1	10	10.37	32.600	25.04	6.56	0.586	-0.034	106	
1	20	10.24	32.575	25.04	6.43	0.574	-0.021	104	
1	29	10.13	32.564	25.05	6.75	0.603	-0.048	109	
1	49	10.09	32.578	25.07	6.38	0.570	-0.015	103	
1	74	9.79	32.643	25.17	6.25	0.558	0.000	100	
1	98	7.70	33.185	25.91	5.15	0.460	0.124	79	
1	122	7.70	33.492	26.16	4.47	0.399	0.183	69	
1	146	8.07	33.734	26.29	3.49	0.312	0.265	54	
1	170	7.74	33.846	26.43	3.19	0.285	0.296	49	
1	194	7.28	33.900	26.54	3.71	0.331	0.256	56	
1	288	6.16	33.988	26.75	2.17	0.194	0.409	32	

BROWN BEAR			CRUISE 322			STATION 043			INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO		
0	10.36	0.00	32.580	0.000	25.03	294.2	0.000	0.00	6.43	0.00			
10	10.37	0.00	32.600	0.000	25.04	293.1	0.030	0.02	6.56	0.00			
20	10.24	0.00	32.575	0.000	25.04	293.1	0.060	0.06	6.43	0.00			
30	10.13	0.00	32.564	0.000	25.05	292.3	0.089	0.14	6.75	0.01	0.99		
50	10.10	0.01	32.575	0.003	25.07	291.3	0.148	0.38	6.38	0.01	0.95		
75	9.70	0.03	32.663	0.005	25.20	279.0	0.220	0.84	6.21	0.01	0.94		
100	7.65	0.02	33.216	0.002	25.95	208.2	0.281	1.38	5.09	0.01	0.89		
150	8.04	0.01	33.759	0.002	26.31	174.2	0.377	2.59	3.42	0.02	0.82		
200	7.16	0.01	33.907	0.001	26.56	151.6	0.460	4.05	2.47	0.26	9.80		
250	6.27	0.07	33.929	0.016	26.69	139.1	0.533	5.74	2.09	0.21	61.51		

BROWN BEAR CRUISE 322 STATION 044 OBSERVED VALUES											
DATE 24/04/63		HR 03.9	LAT 44-14 N	LONG 126-09 W	SNHG 2798	WEA 02	WIND VEL 12 DIR 23	SEA 2 DIR 23	SWELL 2 DIR 21		
BAROM 20.0		TEMP DRY 9.9	WET 7.9	RELHU 74	WTRCLR						
CLOUD TYPE 8		AMT 7	VIS 7	WIRE ANGLE(S) 18, 6, ---	SECDI						
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN AOU	SATN	PHOS	NITR	SIL
2	0	10.25	32.536	25.01	6.96	0.622	-0.068	112	0.71	0.4	4
2	5	10.28	32.541	25.01	6.82	0.609	-0.056	110	0.72	0.7	5
2	10	10.29	32.539	25.01	7.15	0.639	-0.086	116	0.72	0.6	4
2	20	10.11	32.542	25.04	6.88	0.614	-0.060	111	0.75	0.8	5
2	30	9.91	32.531	25.06	6.50	0.581	-0.023	104	0.84	2.5	5
2	50	9.90	32.547	25.08	6.61	0.590	-0.033	106	0.83	2.1	5
2	75	9.40	32.946	25.47	5.61	0.501	0.061	89	1.30	11.1	14
2	100	9.03	33.613	26.05	3.79	0.338	0.226	60	1.95	23.5	28
2	125	8.56	33.828	26.29	3.39	0.303	0.267	53	2.12	28.3	32
2	149	8.21	33.916	26.41	2.98	0.266	0.308	46	2.32	30.7	38
2	173	7.77	33.973	26.52	2.64	0.236	0.344	41	2.39	32.4	40
3	195	7.49	33.998	26.58	2.35	0.210	0.374	36	2.50	33.0	44
3	296	6.47	34.054	26.77	1.66	0.148	0.449	25	2.70	36.0	58
3	492	5.08	34.146	27.01	0.76	0.068	0.550	11	3.19	43.6	83
3	738	4.22	34.318	27.24	0.30	0.027	0.604	4	3.26	43.7	107
3	984	3.58	34.405	27.38	0.36	0.032	0.609	5	3.31	44.9	119
3	1477	2.58	34.532	27.57	0.82	0.073	0.584	11	2.05	43.7	142
3	1772	2.30	34.572	27.63	1.18	0.105	0.557	16	3.21	44.3	155
1	2021	1.86	34.234*	27.39	1.48	0.132	0.539	20	2.78	36.9	111
1	2314	1.81	34.632	27.71	2.00	0.179	0.491	27	2.98	41.2	166
1	2510	1.75	34.642	27.73	1.96	0.175	0.496	26	2.90	40.7	153
1	2656	1.72	34.506*	27.62	0.37*	0.033	0.640	5			

BROWN BEAR CRUISE 322 STATION 044 BIOLOGICAL DATA			
DEPTH	CHL-A	PRODUCTIVITY LAB-I DECK-I	SAL
0	1.69	1.04	32.538
7	0.83	1.15	32.542
22	0.87	0.85	32.536
50	0.72	0.44	32.532
100	0.06	0.06	33.634
43.77 40.65 - WATER COLUMN VALUES			
MESSENGER TIME 2100		INCOMING SOLAR RADIATION - AM 241 PM 167	

DEPTH	BROWN BEAR		CRUISE 322		STATION 044		INTERPOLATED AND COMPUTED VALUES					VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)		
0	10.25	0.00	32.536	0.000	25.01	295.7	0.000	0.00	6.96	0.00	0.94	
10	10.29	0.00	32.539	0.000	25.01	296.3	0.030	0.02	7.15	0.00		
20	10.11	0.00	32.542	0.000	25.04	293.4	0.060	0.06	6.88	0.00		
30	9.91	0.00	32.531	0.000	25.06	291.2	0.089	0.14	6.50	0.00		
50	9.90	0.00	32.547	0.000	25.08	290.3	0.148	0.38	6.61	0.00		
75	9.40	0.00	32.946	0.000	25.47	253.4	0.217	0.81	5.61	0.00	0.94	
100	9.03	0.00	33.613	0.000	26.05	198.8	0.273	1.31	3.79	0.00		
150	8.19	0.00	33.919	0.000	26.42	164.5	0.365	2.47	2.96	0.00		
200	7.43	0.00	34.002	0.001	26.59	148.4	0.444	3.87	2.30	0.01		
250	6.89	0.01	34.035	0.004	26.69	139.3	0.516	5.54	1.90	0.04		
300	6.43	0.00	34.056	0.000	26.77	132.4	0.585	7.48	1.64	0.00	1.44	
400	5.65	0.01	34.102	0.003	26.91	120.2	0.712	12.03	1.12	0.00	0.99	
500	5.04	0.00	34.152	0.001	27.02	110.3	0.829	17.39	0.74	0.00	0.76	
600	4.63	0.03	34.223	0.006	27.12	101.1	0.935	23.40	0.48	0.01	0.96	
700	4.31	0.02	34.292	0.003	27.21	93.2	1.034	29.94	0.33	0.00	0.68	
800	4.04	0.00	34.345	0.002	27.28	87.1	1.125	36.96	0.29	0.01	0.81	
1000	3.54	0.00	34.410	0.000	27.39	78.0	1.292	52.34	0.37	0.00	0.72	
1200	3.08	0.01	34.469	0.000	27.48	69.8	1.441	69.21	0.52	0.01	0.98	
1500	2.56	0.01	34.536	0.000	27.58	50.6	1.640	96.59	0.85	0.00	0.89	
2000	1.89	0.01	34.601	0.001	27.68	50.3	1.922	146.76	1.45	0.00	0.87	
2500	1.75	0.00	34.642	0.000	27.73	47.4	2.170	204.34	1.98	0.00	1.05	
											14.90	

BROWN BEAR CRUISE 322 STATION 045 OBSERVED VALUES

DATE 27/04/63 HR 06.4 LAT 44-15 N LONG 125-55 W WEA 02 WIND VEL 17 DIR 20
 BAROM 17.0 TEMP DRY 11.1 WET 8.6 RELHU 75 WTRCLR SECDI SEA 2 DIR 20 SWELL 2 DIR 20
 CLOUD TYPE 8 AMT 7 VIS 7 WIRE ANGLE(S) 15

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
1	0	10.75	32.604	24.98	6.74	0.602	-0.055	110	
1	5	10.75	32.602	24.98	6.76	0.604	-0.057	110	
1	10	10.78	32.604	24.97	7.03	0.628	-0.081	115	
1	19	10.35	32.630	25.07	7.06	0.631	-0.079	114	
1	29	10.27	32.636	25.08	6.62	0.591	-0.039	107	
1	48	10.39	32.738	25.14	6.36	0.568	-0.017	103	
1	73	9.63	33.162	25.60	4.92	0.439	0.119	79	
1	96	8.94	33.510	25.98	4.09	0.365	0.201	65	
1	121	8.73	33.720	26.18	3.25	0.290	0.278	51	
1	145	8.29	33.884	26.38	2.82	0.252	0.321	44	
1	169	8.00	33.938	26.46	2.61	0.233	0.344	40	
1	194	7.64	33.961	26.53	2.53	0.226	0.356	39	
1	288	6.64	34.020	26.72	1.89	0.169	0.427	28	

BROWN BEAR CRUISE 322 STATION 045 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.75	0.00	32.604	0.000	24.98	298.9	0.000	0.00	6.74	0.00	
10	10.78	0.00	32.604	0.000	24.97	299.6	0.031	0.02	7.03	0.00	
20	10.33	0.00	32.630	0.001	25.07	290.4	0.060	0.06	7.02	0.01	0.88
30	10.28	0.01	32.638	0.001	25.08	289.3	0.090	0.14	6.61	0.01	0.97
50	10.35	0.01	32.767	0.005	25.17	281.2	0.147	0.37	6.26	0.02	0.91
75	9.56	0.01	33.196	0.001	25.64	237.4	0.212	0.78	4.84	0.01	0.88
100	8.90	0.02	33.551	0.003	26.02	201.3	0.268	1.27	3.94	0.01	0.81
150	8.23	0.01	33.901	0.002	26.40	166.3	0.360	2.44	2.76	0.00	0.76
200	7.55	0.00	33.963	0.001	26.55	152.9	0.441	3.88	2.52	0.01	10.03
250	6.88	0.03	33.972	0.010	26.65	143.9	0.515	5.60	2.39	0.06	58.93

BROWN BEAR CRUISE 322 STATION 046 OBSERVED VALUES

DATE 24/04/63 HR 09.0 LAT 44-14 N LONG 125-41 W WEA 53 WIND VEL 21 DIR 23
 BAROM 12.0 TEMP DRY 10.6 WET 6.4 RELHU 56 WTRCLR SEA 2 DIR 23 SWELL 1 DIR 30
 CLOUD TYPE 8 AMT 8 VIS 7 WIRE ANGLE(S) 35,33,12

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
3	0	10.54	32.638	25.04	6.78	0.606	-0.056		110
3	5	10.61	32.640	25.03	6.76	0.604	-0.055		110
3	10	10.63	32.640	25.03	6.66	0.595	-0.047		109
3	19	10.51	32.640	25.05	6.65	0.594	-0.044		108
3	29	10.32	32.636	25.08	6.55	0.585	-0.033		106
3	48	10.32	32.650	25.09	6.63	0.592	-0.040		107
3	73	10.02	32.946	25.37	5.64	0.504	0.051		91
3	97	9.10	33.523	25.96	4.01	0.358	0.206		63
3	121	8.56	33.736	26.22	3.17	0.283	0.288		50
2	169	7.98	33.923	26.45	2.40	0.214	0.362		37
3	169	7.84	33.939	26.49	2.28	0.204	0.375		35
2	425	5.73	34.118	26.91	0.97	0.087	0.522		14
2	640	4.74	34.230	27.12	0.44	0.039	0.584		6
2	856	3.97	34.346	27.29	0.31	0.028	0.607		4
2	1304	2.97	34.500	27.51	0.64	0.057	0.593		9
2	1555	2.51							
1	1885	2.04	34.602	27.67	1.36	0.121	0.544		18
1	2159	1.84	34.620	27.70	1.70	0.152	0.517		23
1	2343	1.75	34.634	27.72	1.83	0.163	0.507		24
1	2598	1.73	34.643	27.73	2.05	0.183	0.488		27

BROWN BEAR CRUISE 322 STATION 046 BIOLOGICAL DATA

INCOMING SOLAR RADIATION - AM 141 PM 120

ZOOPLANKTON (CLARK-BUMPUS) HORIZ - TIME 0325-0345 DEPTHS 100, 70, 35, 0

BROWN BEAR		CRUISE 322		STATION 046		INTERPOLATED AND COMPUTED VALUES						
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0 10 20 30	10.54 10.63 10.49 10.32	0.00 0.00 0.00 0.01	32.638 32.640 32.640 32.634	0.000 0.000 0.000 0.001	25.04 25.03 25.05 25.07	292.9 294.4 292.3 290.1	0.000 0.030 0.060 0.089	0.00 0.02 0.06 0.14	6.78 6.66 6.64 6.56	0.00 0.00 0.00 0.01	 0.88 0.97	
	50 75 100 150	10.31 9.95 9.02 8.12	0.00 0.01 0.00 0.01	32.662 32.996 33.562 33.876	0.000 0.008 0.005 0.007	25.10 25.42 26.01 26.39	288.4 258.3 202.4 166.7	0.147 0.216 0.274 0.367	0.38 0.81 1.33 2.50	6.59 5.50 3.88 2.58	0.01 0.02 0.01 0.02	 0.91 0.88 0.85 0.70
		200 250 300 400	7.58 7.09 6.64 5.89	0.03 0.02 0.01 0.00	33.991 34.066 34.114 34.131	0.018 0.043 0.051 0.018	26.56 26.69 26.79 26.90	151.3 139.7 130.8 121.1	0.447 0.521 0.589 0.716	3.93 5.61 7.54 12.08	2.03 1.62 1.31 0.99	0.03 0.11 0.14 0.05
500 600 700 800			5.33 4.89 4.51 4.15	0.02 0.01 0.00 0.00	34.159 34.210 34.263 34.317	0.001 0.001 0.001 0.001	26.99 27.08 27.17 27.25	113.3 105.1 97.6 90.4	0.834 0.944 1.047 1.142	17.54 23.75 30.58 37.90	0.73 0.50 0.37 0.32	0.00 0.00 0.01 0.01
	1000 1200 1500 2000		3.59 3.16 2.60 1.94	0.02 0.02 0.00 0.00	34.405 34.472 34.544 34.609	0.002 0.001 0.001 0.003	27.38 27.47 27.58 27.69	79.0 70.4 60.5 50.2	1.313 1.465 1.664 1.945	53.65 70.70 98.18 148.30	0.36 0.52 0.87 1.52	0.02 0.02 0.02 0.02
		2500	1.72	0.00	34.642	0.000	27.73	46.9	2.193	205.59	1.95	0.00

BROWN BEAR CRUISE 322 STATION 46A BIOLOGICAL DATA

DATE 24/04/63 LAT 44-16 N LONG 125-30 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.63	2.06	18.32	32.614

MESSAGE TIME 0450 INCOMING SOLAR RADIATION - AM 141 PM 120

BROWN BEAR CRUISE 322 STATION 047 OBSERVED VALUES
 DATE 24/04/63 HR 14.2 LAT 44-14 N LONG 125-25 W WEA 53 WIND VEL 24 DIR 19
 BAROM 12.0 TEMP DRY 8.4 WET 7.8 RELHU 93 WTRCLR SECDI 2880 SEA 3 DIR 19 SWELL 1 DIR 21
 CLOUD TYPE 8 AMT 8 VIS 7 WIRE ANGLE(S) 19

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
1	0	10.45	32.609	25.03	6.62	0.591	-0.041	107	
1	5	10.46	32.609	25.03	6.69	0.598	-0.047	109	
1	9	10.49	32.621	25.04	6.48	0.579	-0.029	105	
1	19	10.50	32.634	25.04	6.63	0.592	-0.042	108	
1	28	10.44	32.645	25.06	6.47	0.578	-0.027	105	
1	45	10.36	32.666	25.09	6.31	0.564	-0.012	102	
1	69	9.88	33.067	25.49	5.81	0.519	0.037	193	
1	94	9.07	33.508	25.96	4.10	0.366	0.198	65	
1	117	8.60	33.768	26.24	3.39	0.303	0.267	53	
1	163	8.15	33.921	26.43	2.67	0.238	0.336	41	
1	187	7.78	33.964	26.51	2.54	0.227	0.353	39	
1	278	6.84	34.018	26.69	1.89	0.169	0.424	28	

BROWN BEAR CRUISE 322 STATION 047 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY	SAL
		LAB-I	DECK-I
0	0.59	0.90	32.625
7	0.56	0.87	32.629
22	0.56	0.74	32.628
50	0.57	0.55	32.648
100	0.17	0.00	33.344

28.18 36.28 - WATER COLUMN VALUES

MESSENGER TIME 0631 INCOMING SOLAR RADIATION - AM 141 PM 120

DEPTH	BROWN BEAR		CRUISE 322		STATION 047		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	10.45	0.00	32.609	0.000	25.03	293.6	0.000	0.00	6.62	0.00		
10	10.49	0.00	32.623	0.000	25.04	293.5	0.030	0.02	6.48	0.02	1.00	
20	10.49	0.00	32.635	0.000	25.05	292.7	0.060	0.06	6.62	0.01	0.85	
30	10.44	0.00	32.642	0.004	25.06	291.5	0.089	0.14	6.45	0.01	0.94	
50	10.29	0.00	32.731	0.011	25.15	282.9	0.147	0.37	6.27	0.02	0.82	
75	9.69	0.02	33.179	0.006	25.60	240.6	0.213	0.79	5.41	0.07	0.74	
100	8.93	0.00	33.588	0.001	26.05	199.0	0.268	1.28	3.86	0.02	0.70	
150	8.26	0.03	33.907	0.013	26.40	166.4	0.360	2.44	2.79	0.01	0.92	
200	7.57	0.01	33.980	0.001	26.56	152.0	0.440	3.87	2.50	0.01	7.61	
250	6.93	0.04	34.009	0.004	26.67	141.8	0.515	5.58	2.27	0.05	15.70	

BROWN BEAR										CRUISE 322		STATION 048		OBSERVED VALUES					
DATE 24/04/63		HR 17.1	LAT 44-14 N	LONG 125-13 W	SNDG 2286	WEA 03	WIND VEL 10 DIR 31	SEA 2 DIR 31	SWELL 2 DIR 26										
BAROM 12.0		TEMP DRY 9.3	WEI 8.3	RELHU 86	WIRCLR	SECDI 12													
CLOUD TYPE 8		AMT 8	VIS	WIRE ANGLE(S) 25.00															
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL							
2	0	10.60	32.678	25.06	6.43	0.574	-0.026	105	0.65	1.9	4								
2	5	10.58	32.674	25.06	6.62	0.591	-0.043	108	0.80	3.1	4								
2	10	10.59	32.678	25.06	6.51	0.581	-0.033	106	0.78	2.9	4								
2	20	10.51	32.671	25.07	6.47	0.578	-0.028	105	0.61	3.7	4								
2	30	10.39	32.705	25.12	6.31	0.564	-0.013	102	0.87	4.0	7								
2	49	10.33	32.762	25.17	7.52	0.672	-0.120	122	0.97	6.8	8								
2	74	9.62	33.140	25.58	4.83	0.431	0.127	77	1.55	15.8	19								
2	99	9.39	33.520	25.92	4.14	0.370	0.190	66	1.82	23.1	26								
2	124	8.64	33.754	26.22	3.17	0.283	0.286	50	2.13	28.6	34								
2	173	8.00	33.904	26.43	2.41	0.215	0.362	37	2.36	31.1	43								
1	181	7.96	33.904	26.44	2.58	0.230	0.347	40	2.35	30.4	43								
1	296	7.31	34.000	26.61	2.07	0.185	0.401	32	2.37	32.6	48								
1	451	5.72	34.115	26.91	0.95	0.085	0.524	14	2.79	38.7	70								
1	685	4.39	34.244	27.17	0.32	0.029	0.600	5	3.04	43.1	100								
1	922	3.81	34.392	27.34	0.30	0.027	0.610	4	3.10	44.2	115								
1	1404	2.71	34.520	27.55	0.72	0.064	0.590	10	3.07	43.7	141								
1	1694	2.24	34.555	27.62	1.19	0.106	0.556	16	2.87	41.5	142								

BROWN BEAR			CRUISE 322	STATION 048		BIOLOGICAL DATA				
DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	LIGHT PROD	SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	0.76	1.15	7.48			50	32.664	0.83	3.0	3
6	0.62	1.03	6.24			10	32.668	0.81	2.6	3
16	0.89	1.25	1.12			1	32.669	0.84	2.7	4
40	0.93	0.73	1.12	0.90	100		32.718	0.86	3.4	5
				0.82	66					
				0.86	49					
				0.78	35					
				0.63	16					
100	0.08	0.01		0.24	5		33.584	1.98	23.2	29
33.53 41.72 104.94 - WATER COLUMN VALUES										
MESSENGER TIME 1130 INCOMING SOLAR RADIATION - AM 141 PM 120										
LIGHT SATURATION INCUBATOR ILLUMINATION 19100										

DEPTH	BROWN BEAR		CRUISE 322		STATION 048		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VCL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	10.60	0.00	32.678	0.000	25.06	290.9	0.000	0.00	6.43	0.00		
10	10.59	0.00	32.678	0.000	25.06	290.9	0.030	0.02	6.51	0.00		
20	10.51	0.00	32.671	0.000	25.07	290.3	0.059	0.06	6.47	0.00		
30	10.39	0.00	32.705	0.000	25.12	286.1	0.088	0.14	6.31	0.00		
50	10.30	0.01	32.774	0.002	25.19	280.0	0.145	0.37	7.44	0.04	0.95	
75	9.31	0.01	33.157	0.001	25.60	241.1	0.211	0.78	4.79	0.01	0.94	
100	9.36	0.01	33.532	0.000	25.93	209.9	0.268	1.29	4.10	0.00	0.95	
150	8.23	0.05	33.858	0.018	26.36	169.6	0.363	2.49	2.73	0.10	0.75	
200	7.81	0.05	33.940	0.013	26.49	158.3	0.446	3.97	2.33	0.12	1.04	
250	7.52	0.07	33.987	0.016	26.57	151.5	0.524	5.77	2.12	0.12	0.82	
300	7.27	0.01	34.003	0.000	26.62	147.6	0.599	7.90	2.04	0.00	0.97	
400	6.26	0.05	34.079	0.000	26.81	129.7	0.739	12.88	1.32	0.04	0.66	
500	5.36	0.01	34.144	0.002	26.98	114.7	0.863	18.55	0.74	0.02	0.83	
600	4.76	0.02	34.199	0.003	27.09	104.4	0.973	24.78	0.44	0.03	0.71	
700	4.34	0.01	34.254	0.001	27.18	96.4	1.075	31.54	0.31	0.00	0.92	
800	4.06	0.03	34.318	0.003	27.26	89.2	1.168	38.76	0.26	0.02	0.60	
1000	3.61	0.01	34.424	0.003	27.39	77.9	1.338	54.31	0.33	0.00	0.94	
1200	3.14	0.01	34.485	0.006	27.48	69.3	1.487	71.11	0.48	0.01	0.88	
1500	2.53	0.00	34.532	0.001	27.57	60.6	1.684	98.41	0.86	0.00	9.25	

BROWN BEAR CRUISE 322 STATION 049 OBSERVED VALUES
 DATE 24/04/63 HR 21.2 LAT 44-14 N LONG 124-59 W WIND VEL 9 DIR 29
 BAROM 13.0 TEMP DRY 11.6 WET 9.0 RELHU 69 WTRCLR SECDI 603 WEA SEA DIR 29 SWELL DIR 24
 CLOUD TYPE VIS WIRE ANGLE(S) 4
 CST DEPTH TEMP SAL SIGMA-T ML/L MGA/L OXYGEN - - - -
 ML/L AOU SATN
 1 0 10.61 32.653 25.04 6.53 0.583 -0.035 106
 1 5 10.57 32.658 25.05 6.70 0.598 -0.050 109
 1 10 10.53 32.656 25.06 6.62 0.591 -0.042 108
 1 20 10.53 32.658 25.06 6.57 0.587 -0.038 107
 1 30 10.42 32.650 25.07 6.56 0.586 -0.035 106
 1 50 10.24 32.654 25.10 6.37 0.569 -0.016 103
 1 75 9.98 32.894 25.33 5.64 0.504 0.052 91
 1 100 9.37 33.488 25.90 4.09 0.365 0.195 65
 1 125 8.82 33.642 26.10 3.25 0.290 0.277 51
 1 175 7.92 33.916 26.46 2.82 0.252 0.326 44
 1 199 7.35 33.940 26.56 3.01 0.268 0.317 46
 1 296 6.26 33.991 26.74 1.76 0.157 0.444 26

BROWN BEAR CRUISE 322 STATION 049 INTERPOLATED AND COMPUTED VALUES
 DEPTH TEMP E(T) SAL E(S) SIGMA-T SP VOL GEOPT POT OXY E(O) VAR
 ANOMALY ANOMALY ENERGY ML/L RATIO
 0 10.61 0.00 32.653 0.000 25.04 292.9 0.000 0.00 6.53 0.00
 10 10.53 0.00 32.656 0.000 25.06 291.6 0.030 0.02 6.62 0.00
 20 10.53 0.00 32.658 0.000 25.06 291.6 0.059 0.06 6.57 0.00
 30 10.42 0.00 32.650 0.000 25.07 290.6 0.089 0.14 6.56 0.00
 50 10.24 0.00 32.654 0.000 25.10 287.8 0.147 0.38 6.37 0.00
 75 9.98 0.00 32.894 0.000 25.33 266.3 0.217 0.82 5.64 0.00
 100 9.37 0.00 33.488 0.000 25.90 213.2 0.277 1.35 4.09 0.00
 150 8.38 0.03 33.801 0.011 26.30 176.0 0.375 2.59 2.86 0.02 0.96
 200 7.33 0.00 33.940 0.000 26.56 151.5 0.458 4.06 2.81 0.14 2.69
 250 6.35 0.06 33.918 0.019 26.68 140.9 0.531 5.75 2.46 0.20 20.90

BROWN BEAR CRUISE 322 STATION 050 OBSERVED VALUES

DATE 24/04/63 HR 22.7 LAT 44-14 N LONG 124-45 W SNOG 101 WEA 21 WIND VEL 0 DIR 00
 BAROM 12.0 TEMP DRY 12.8 WET 10.3 RELHU 76 WTRCLR SECDI 6 SEA 0 DIR 24 SWELL DIR
 CLOUD TYPE 6 AMT 9 VIS 9 WIRE ANGLE(S) 4

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
1	0	10.66	32.368	24.81	6.92	0.618	-0.069	113	
1	5	10.62	32.382	24.83	7.19	0.642	-0.093	117	
1	10	10.58	32.381	24.83	6.89	0.615	-0.065	112	
1	20	10.35	32.496	24.96	6.48	0.579	-0.027	105	
1	29	10.28	32.544	25.01	6.41	0.573	-0.020	104	
1	49	10.27	32.614	25.07	6.19	0.553	0.000	100	
1	74	10.53	33.097	25.40	4.72	0.422	0.126	77	
1	99	8.65	33.656	26.14	3.23	0.288	0.281	51	

BROWN BEAR CRUISE 322 STATION 050 BIOLOGICAL DATA

DEPTH CHL-A PRODUCTIVITY
 LAB-I DECK-I

0	3.04	3.57
2		4.04
8	3.77	4.49
16	3.16	4.18
90	3.63	1.43

54.96 67.88 - WATER COLUMN VALUES

MESSANGER TIME 1455 INCOMING SOLAR RADIATION - AM 141 PM 120

BROWN BEAR			CRUISE 322			STATION 050			INTERPOLATED AND COMPUTED VALUES						
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO				
0	10.66	0.00	32.368	0.000	24.81	314.8	0.000	0.00	6.92	0.00	0.99				
10	10.58	0.00	32.381	0.000	24.83	312.7	0.032	0.02	6.89	0.00					
20	10.35	0.00	32.496	0.000	24.96	300.7	0.063	0.06	6.48	0.00					
30	10.27	0.00	32.545	0.003	25.01	296.0	0.093	0.14	6.41	0.01					
50	10.30	0.02	32.628	0.002	25.07	290.6	0.152	0.38	6.14	0.01	0.95				
75	10.51	0.01	33.120	0.001	25.42	258.3	0.221	0.82	4.65	0.00	6.86				

BROWN BEAR										OBSERVED VALUES																
DATE 25/04/63			HR 00.5			LAT 44-14 N			LONG 124-32 W			SDNG 91			WEA 54			WIND VEL 5			DIR 20					
BAROM 14.0			TEMP DRY 10.0			WET 8.8			RELHU 87			WTRCLR			SEA 2			DIR 20			SWELL 1			DIR 22		
CLOUD TYPE 8			VIS 6			WIRE ANGLE(S) 2																				
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL														
1	0	10.55	32.246	24.73	6.88	0.614	-0.064		112	0.59	0.8	7														
1	5	10.59	32.332	24.79	6.91	0.617	-0.067		112	0.30	0.6	5														
1	10	10.62	32.346	24.80	6.88	0.614	-0.065		112	0.69	0.5	7														
1	20	10.62	32.356	24.81	6.91	0.617	-0.068		112	0.63	0.5	7														
1	30	10.62	32.412	24.85	6.89	0.615	-0.066		112	0.67	0.8	7														
1	49	10.39	32.580	25.02	6.45	0.576	-0.025		105	0.78	3.1	8														
1	74	10.39	32.627	25.06	6.25	0.558	-0.007		101	0.79	3.7	11														

BROWN BEAR		CRUISE 322		STATION 051		INTERPOLATED AND COMPUTED VALUES					
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.55	0.00	32.246	0.000	24.73	322.0	0.000	0.00	6.88	0.00	
10	10.62	0.00	32.346	0.000	24.80	316.0	0.033	0.02	6.88	0.00	
20	10.62	0.00	32.356	0.000	24.81	315.4	0.064	0.07	6.91	0.00	
30	10.62	0.00	32.412	0.000	24.85	311.5	0.096	0.15	6.89	0.00	
50	10.47	0.06	32.588	0.001	25.01	296.4	0.157	0.40	6.42	0.00	13.22

BROWN BEAR CRUISE 322 STATION 052 OBSERVED VALUES
 DATE 25/04/63 HR 02.1 LAT 44-14 N LONG 124-18 W SNG 78 WEA 02 WIND VEL 5 DIR 20
 BAROM 13.0 TEMP DRY 8.6 WET 8.0 RELHU 86 WTRCLR SEC DI 7 SEA 2 DIR 20 SWELL 1 DIR 22
 CLOUD TYPE 8 AMT 8 VIS 7 WIRE ANGLE(S) 2

CST DEPTH		TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
1	0	10.49	32.296	24.78	7.37	0.658	-0.107	119	
1	5	10.52	32.462	24.91	6.80	0.607	-0.057	110	
1	10	10.55	32.299	24.77	7.18	0.641	-0.091	117	
1	20	10.49	32.531	24.97	6.62	0.591	-0.041	107	
1	40	10.44	32.552	24.99	7.28	0.650	-0.099	118	
1	59	10.40	32.649	25.07	6.29	0.562	-0.011	102	

BROWN BEAR CRUISE 322 STATION 052 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	2.74	2.16		32.286
3	2.78	2.98		32.288
10	3.55	2.88		32.296
19	1.84	1.71		32.341

54.69 48.90 - WATER COLUMN VALUES

MESSANGER TIME 1818 INCOMING SOLAR RADIATION - AM 141 PM 120

BROWN BEAR CRUISE 322 STATION 052				INTERPOLATED AND COMPUTED VALUES							
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEO POT ANOMALY	POT ENERGY	OXY ML/L	E(G)	VAR RATIO
0	10.49	0.00	32.296	0.000	24.78	317.4	0.000	0.00	7.37	0.00	
10	10.55	0.00	32.299	0.000	24.77	318.3	0.033	0.02	7.18	0.00	
20	10.49	0.00	32.531	0.000	24.97	300.4	0.064	0.06	6.62	0.00	
30	10.46	0.00	32.573	0.028	25.00	296.9	0.094	0.14	6.91	0.17	0.80
50	10.42	0.00	32.663	0.046	25.08	290.1	0.153	0.38	7.24	0.09	10.62

BROWN BEAR CRUISE 322 STATION 053 OBSERVED VALUES

CUMMINS PEAK

DATE 25/04/63 HR 03.4 LAT 44-14 N LONG 124-10 W SNGD 46 WEA 63 WIND VEL 5 DIR 22
BAROM 13.2 TEMP DRY VIS. WET WTRCLR WTRCLR SEA 3 DIR 23 SWELL DIR
CLOUD TYPE WIRE ANGLE(S) 5

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
1	0	11.08	29.089	22.19	7.18	0.641	-0.085	115	0.53	0.5	18
1	5	11.07	29.446	22.47	8.40	0.750	-0.195	135	0.61	0.6	17
1	10	10.65	31.342	24.01	7.35	0.656	-0.104	119	0.83	2.6	11
1	30	10.41	32.619	25.05	6.83	0.610	-0.059	111	1.00	4.0	10

BROWN BEAR CRUISE 322 STATION 053 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY	LAB-I	DECK-I	SAL
0	3.32	3.22			29.340
2	3.72				29.343
8	3.48	2.88			29.837
16	2.00	1.41			31.054
30	0.59	0.36			31.582

50.51 41.56 - WATER COLUMN VALUES

MESSANGER TIME 1935 INCOMING SOLAR RADIATION - AM 141 PM 120

BROWN BEAR		CRUISE 322		STATION 053		INTERPOLATED AND COMPUTED VALUES					
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	11.08	0.00	29.089	0.000	22.19	564.4	0.000	0.00	7.18	0.00	
10	10.65	0.00	31.342	0.000	24.01	390.8	0.049	0.02	7.35	0.00	
20	10.52	0.18	32.157	0.723	24.67	328.5	0.085	0.07	7.67	0.88	1.33
30	10.41	0.00	32.619	0.000	25.05	292.7	0.116	0.15	6.83	0.00	

BROWN BEAR CRUISE 322 STATION 054 OBSERVED VALUES

SAND LAKE

DATE 25/04/63		HR 10.7	LAT 45-14 N		LONG 124-01 W		SNDG 42		WEA 00		WIND VEL 0 DIR 00		
BAROM 12.0		TEMP DRY 9.4		WET 7.8		RELHU 80		WTRCLR 3		SECDI		SEA 1 DIR 21 SWELL 2 DIR 21	
CLOUD TYPE		AMT 9		VIS		WIRE ANGLE(S)							
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	ADU	SATN	PHOS	NITR	SIL	
1	0	10.33	30.874	23.70	6.64	0.593	-0.034		106	0.67	1.8	10	
1	5	10.46	31.606	24.25	6.60	0.589	-0.035		106	0.72	1.8	9	
1	10	10.47	31.674	24.30	6.65	0.594	-0.040		107	0.74	1.7	9	
1	20	10.50	31.872	24.45	6.54	0.584	-0.031		106	0.78	2.3	10	
1	30	10.29	32.376	24.88	6.04	0.539	0.014		98	0.99	3.7	11	

BROWN BEAR CRUISE 322 STATION 054 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	1.75	3.96		30.158
2	1.88	3.84		30.243
8	2.57	3.54		31.595
16	2.33	3.50		31.729
30	0.89	1.02		32.377

36.61 58.08 - WATER COLUMN VALUES

MESSANGER TIME 0300 INCOMING SOLAR RADIATION - AM 220 PM 220

101

BROWN BEAR			CRUISE 322		STATION 054		INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.33	0.00	30.874	0.000	23.70	420.1	0.000	0.00	6.64	0.00	
10	10.47	0.00	31.674	0.000	24.30	363.3	0.040	0.02	6.65	0.00	
20	10.50	0.00	31.872	0.000	24.45	349.3	0.076	0.07	6.54	0.00	
30	10.29	0.00	32.376	0.000	24.88	308.8	0.109	0.16	6.04	0.00	

BROWN BEAR CRUISE 322 STATION 055 OBSERVED VALUES
 DATE 25/04/63 HR 12.2 LAT 45-14 N LONG 124-12 W WEA 02 WIND VEL 14 DIR 36
 BAROM 12.0 TEMP DRY 9.7 WET 8.1 RELHU 86 WTRCLR SEA 1 DIR 36 SWELL 1 DIR 24
 CLOUD TYPE 3 AMT 6 VIS 9 WIRE ANGLE(S) 4
 CST DEPTH TEMP SAL SIGMA-T ML/L MGA/L OXYGEN AOU SATN
 1 0 10.34 32.004 24.58 6.53 0.583 -0.029 105
 1 5 10.41 32.004 24.57 6.62 0.591 -0.038 107
 1 10 10.48 32.004 24.56 6.60 0.589 -0.037 107
 1 20 10.27 32.189 24.74 6.60 0.589 -0.035 106
 1 30 10.19 32.208 24.76 6.52 0.582 -0.027 105
 1 49 10.02 32.315 24.88 6.37 0.569 -0.012 102
 1 74 9.75 32.810 25.31 5.48 0.489 0.069 88
 1 99 9.40 33.218 25.68 4.48 0.400 0.161 71
 1 124 8.23 33.801 26.32 2.45 0.219 0.355 38

BROWN BEAR CRUISE 322 STATION 055 BIOLOGICAL DATA
 DEPTH CHL-A PRODUCTIVITY LAB-I DECK-I SAL
 0 1.64 0.91 6.60 32.044
 2 1.70 1.36 32.038
 8 1.18 32.039
 16 1.33 1.01 32.289
 100 0.09 0.12 33.474
 24.55 18.68 - WATER COLUMN VALUES
 MESSENGER TIME 0430 INCOMING SOLAR RADIATION - AM 220 PM 220

BROWN BEAR			CRUISE 322			STATION 055			INTERPOLATED AND COMPUTED VALUES					
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO			
0	10.34	0.00	32.004	0.000	24.58	336.6	0.000	0.00	6.53	0.00				
10	10.48	0.00	32.004	0.000	24.56	339.0	0.035	0.02	6.60	0.00				
20	10.27	0.00	32.189	0.000	24.74	322.1	0.068	0.07	6.60	0.00				
30	10.19	0.00	32.208	0.000	24.76	319.6	0.100	0.15	6.52	0.00				
50	10.01	0.00	32.332	0.003	24.89	307.9	0.163	0.41	6.34	0.00	0.95			
75	9.74	0.00	32.825	0.002	25.32	267.7	0.236	0.87	5.45	0.01	0.94			
100	9.37	0.00	33.236	0.001	25.70	231.9	0.299	1.43	4.42	0.00	5.15			

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BROWN BEAR										OBSERVED VALUES									
DATE 25/04/63			HR 14.2		LAT 45-15 N		LONG 124-26 W		STATION 056		SNDG 417		WEA 02		WIND VEL 17 DIR 05				
BAROM 12.0			TEMP DRY 9.6		WET 7.9		RELHU 80		WTRCLR		SECDI		SEA 1 DIR 05		SWELL 1 DIR 24				
CLOUD TYPE 3			AMT 6		VIS 7		WIRE ANGLE(S) 10												
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL							
1	0	10.05	32.286	24.85	6.61	0.590	-0.034	106	0.20	0.20	1.2	3							
1	5	10.05	32.288	24.85	6.78	0.606	-0.049	109	0.35	0.35	1.3	4							
1	10	10.08	32.290	24.85	6.65	0.594	-0.038	107	0.56	0.56	0.4	5							
1	20	10.05	32.286	24.85	6.64	0.593	-0.036	107	0.61	0.61	0.4	5							
1	30	10.00	32.315	24.88	6.54	0.584	-0.027	105	0.63	0.63	0.7	5							
1	50	9.71	32.398	24.99	6.17	0.551	0.009	98	0.77	0.77	2.7	7							
1	75	9.58	33.072	25.54	5.12	0.457	0.102	82	1.38	1.38	14.7	19							
1	100	8.34	33.368	25.96	4.21	0.376	0.198	65	1.74	1.74	21.0	26							
1	125	8.12	33.721	26.27	3.20	0.286	0.290	50	2.10	2.10	28.3	34							
1	175	7.70	33.934	26.50	2.48	0.221	0.360	38	2.28	2.28	31.5	41							
1	200	7.42	33.939	26.55	2.36	0.211	0.374	36	2.33	2.33	32.6	44							
1	297	6.44	33.975	26.71	1.69	0.151	0.447	25	2.54	2.54	35.2	58							

BROWN BEAR			CRUISE 322			STATION 056			INTERPOLATED AND COMPUTED VALUES						
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO				
0	10.05	0.00	32.286	0.000	24.85	311.0	0.000	0.00	6.61	0.00					
10	10.08	0.00	32.290	0.000	24.85	311.4	0.032	0.02	6.65	0.00					
20	10.05	0.00	32.286	0.000	24.85	311.4	0.063	0.06	6.64	0.00					
30	10.00	0.00	32.315	0.000	24.88	308.7	0.094	0.15	6.54	0.00					
50	9.71	0.00	32.398	0.000	24.99	298.3	0.156	0.40	6.17	0.00					
75	9.58	0.00	33.072	0.000	25.54	246.8	0.224	0.83	5.12	0.00					
100	8.34	0.00	33.368	0.000	25.96	206.7	0.281	1.33	4.21	0.00					
150	7.92	0.01	33.885	0.016	26.43	163.1	0.375	2.50	2.69	0.05	0.94				
200	7.42	0.00	33.939	0.000	26.55	152.9	0.454	3.93	2.36	0.00					
250	6.85	0.02	33.997	0.028	26.67	141.5	0.528	5.64	2.20	0.05	19.98				

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BROWN BEAR										CRUISE 322				STATION 057				OBSERVED VALUES					
DATE 25/04/63										HR 16.2		LAT 45-14 N		LONG 124-41 W		SNDG 530		WEA 02		WIND VEL 10 DIR 10			
BAROM 13.6										TEMP DRY 9.7		WET 8.1		RELHU 80		WTRCLR		SECDI 11		SEA 1 DIR 10 SWELL 2 DIR 35			
CLOUD TYPE 3										AMT 6		VIS 7		WIRE ANGLE(S) ---									
CST	DEPTH	TEMP	SAL		SIGMA-T		ML/L		MGA/L		OXYGEN		ADU		SATN								
1	0	10.01	32.264		24.84		6.55		0.585		-0.028				105								
1	5	10.01	32.264		24.84		6.63		0.592		-0.035				106								
1	10	10.03	32.259		24.83		6.56		0.586		-0.029				105								
1	20	10.02	32.266		24.84		6.53		0.583		-0.026				105								
1	30	9.93	32.293		24.87		6.57		0.587		-0.029				105								
1	49	9.54	32.811		25.34		5.47		0.489		0.072				87								
1	74	9.10	33.098		25.64		4.63		0.414		0.152				73								
1	99	8.09	33.445		26.06		3.88		0.347		0.231				60								
1	124	7.85	33.722		26.31		3.17		0.283		0.297				49								
1	173	7.75	33.942		26.50		2.46		0.220		0.360				38								
1	190	7.45	33.944		26.55		2.23		0.199		0.385				34								
1	296	6.34	34.012		26.75		1.65		0.147		0.452				25								

SEA 1 DIR 10 SWELL 2 DIR 35 WEA 02 WIND VEL 10 DIR 10

BROWN BEAR CRUISE 322 STATION 057 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	1.27	1.29		32.282
6	1.34	1.42		32.267
16	1.34	1.05		32.265
40	1.34	1.04		32.276
53.41	40.56	-	WATER COLUMN VALUES	
MESSENGER TIME 0836			INCOMING SOLAR RADIATION - AM 220	PM 220

BROWN BEAR			CRUISE 322		STATION 057		INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E (T)	SAL	E (S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E (O)	VAR RATIO
0	10.01	0.00	32.264	0.000	24.84	312.0	0.000	0.00	6.55	0.00	
10	10.03	0.00	32.259	0.000	24.83	312.9	0.032	0.02	6.56	0.00	
20	10.02	0.00	32.266	0.000	24.84	312.4	0.063	0.07	6.53	0.00	
30	9.93	0.00	32.293	0.000	24.87	309.2	0.095	0.15	6.57	0.00	
50	9.53	0.00	32.826	0.003	25.36	263.8	0.152	0.38	5.43	0.00	0.95
75	9.06	0.01	33.112	0.001	25.65	235.8	0.215	0.78	4.60	0.00	0.94
100	8.07	0.00	33.458	0.000	26.07	196.1	0.270	1.26	3.85	0.00	0.95
150	7.84	0.07	33.885	0.005	26.44	161.9	0.360	2.40	2.73	0.03	1.13
200	7.24	0.01	33.936	0.004	26.57	150.7	0.439	3.81	2.10	0.00	6.53
250	6.30	0.12	33.884	0.029	26.66	142.7	0.513	5.51	1.66	0.02	42.41

BROWN BEAR CRUISE 322 STATION 058 OBSERVED VALUES
 DATE 25/04/63 HR 18.6 LAT 45-14 N LONG 124-55 W SNGD 951 WEA 00 WIND VEL 16 DIR 35
 BAROM 14.0 TEMP DRY 11.4 WET 9.0 REL HU 69 WTR CLR SECDI 9 SEA 2 DIR 35 SWELL 2 DIR 35
 CLOUD TYPE 3 AMT 4 VIS WIRE ANGLE(S) 27,11

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	ADU	SATN
					ML/L	MGA/L		
2	0	10.20	32.296	24.83	6.92	0.618	-0.063	111
2	5	10.24	32.288	24.82	6.74	0.602	-0.048	109
2	10	10.21	32.289	24.82	6.79	0.606	-0.052	109
2	19	10.08	32.290	24.85	7.02	0.627	-0.071	113
2	29	9.94	32.302	24.88	6.80	0.607	-0.049	109
2	48	9.69	32.492	25.07	6.10	0.545	0.016	97
2	73	8.99	33.169	25.71	4.60	0.411	0.156	72
2	97	8.19	33.512	26.10	3.83	0.342	0.234	59
2	122	8.23	33.752	26.28	3.29	0.294	0.281	51
2	170	7.75	33.914	26.48	2.59	0.231	0.349	40
1	332*	6.11	34.041	26.80	1.61	0.144	0.459	24
1	566*	4.71	34.182	27.08	0.76	0.068	0.555	11
1	731*	4.23	34.292	27.22	0.31	0.028	0.603	4

BROWN BEAR CRUISE 322 STATION 058 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	LIGHT PROD	SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	1.01	0.95	14.46	1.97 1.75 1.58 1.25	100 66 49 35		32.295			
6	1.22	2.03	13.98	0.83	16					
20	1.24	2.32	5.56	0.14	5	50 10	32.295 32.290	0.77 0.67	0.4 0.6	6 6
36	1.29	1.50	0.76			1	32.319	0.70	0.6	6

44.13 70.03 272.64 - WATER COLUMN VALUES

MESSANGER TIME 1152 INCOMING SOLAR RADIATION - AM 220 PM 220

LIGHT SATURATION INCUBATOR ILLUMINATION 19000

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.20	0.00	32.296	0.000	24.83	312.7	0.000	0.00	6.92	0.00	
10	10.21	0.00	32.289	0.000	24.82	313.6	0.032	0.02	6.79	0.00	
20	10.07	0.00	32.290	0.001	24.85	311.4	0.064	0.07	7.01	0.01	0.88
30	9.93	0.00	32.306	0.001	24.88	308.2	0.095	0.15	6.77	0.00	0.97
50	9.64	0.00	32.543	0.010	25.12	286.5	0.155	0.39	5.98	0.02	0.91
75	8.91	0.01	33.205	0.002	25.75	226.7	0.219	0.79	4.52	0.01	0.88
100	8.18	0.02	33.547	0.000	26.13	191.0	0.272	1.26	3.75	0.00	0.86
150	7.81	0.16	33.891	0.001	26.45	161.0	0.361	2.38	2.86	0.01	1.10

DATE 25/04/63 HR 22.0 LAT 45-14 N LONG 125-10 W
 BAROM 14.0 TEMP DRY 11.2 WET 8.9 REL HU 75 WTR CLR
 CLOUD TYPE 8 AMT 3 VIS WIRE ANGLE(S) 11,11
 BROWN BEAR CRUISE 322 STATION 059
 OBSERVED VALUES
 SNRG 1463 WEA 03 WIND VEL 16 DIR 34
 SECD1 SEA 3 DIR 32 SWELL 2 DIR 29

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	MGA/L	ADU	SATN
1	0	9.89	32.370	24.94	7.02	0.627	0.627	0.068	112
1	5	9.93	32.394	24.95	7.41	0.662	0.662	0.104	119
1	10	9.92	32.370	24.94	6.88	0.614	0.614	0.056	110
1	19	9.85	32.380	24.96	6.92	0.618	0.618	0.060	111
1	29	9.72	32.371	24.97	6.78	0.605	0.605	0.044	108
1	48	9.53	32.450	25.06	6.52	0.582	0.582	0.019	103
1	73	9.49	32.531	25.13	6.35	0.567	0.567	0.004	101
1	97	8.16	33.013	25.71	5.16	0.461	0.461	0.117	80
1	121	8.10	33.449	26.06	3.82	0.341	0.341	0.236	59
2	171	7.40	33.896	26.52	3.47	0.310	0.310	0.274	53
2	196	7.29	33.950	26.57	2.58	0.230	0.230	0.352	40
2	293	6.42	34.010	26.74	1.99	0.178	0.178	0.421	30

100

DEPTH	BROWN BEAR		CRUISE 322		STATION 059		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	9.89	0.00	32.370	0.000	24.94	302.3	0.000	0.00	7.02	0.00		
10	9.92	0.00	32.370	0.000	24.94	303.0	0.031	0.02	6.88	0.00		
20	9.84	0.00	32.379	0.001	24.96	301.2	0.061	0.06	6.91	0.00	0.88	
30	9.71	0.00	32.374	0.001	24.97	299.7	0.092	0.14	6.76	0.00	0.97	
50	9.55	0.02	32.449	0.006	25.06	292.0	0.151	0.38	6.52	0.02	0.91	
75	9.38	0.03	32.564	0.006	25.18	281.3	0.223	0.85	6.27	0.01	0.88	
100	8.12	0.03	33.073	0.002	25.77	225.5	0.287	1.41	4.98	0.02	0.85	
150	7.70	0.06	33.774	0.007	26.38	168.3	0.387	2.65	3.53	0.21	0.96	
200	7.28	0.00	33.952	0.002	26.58	149.9	0.467	4.08	2.43	0.01	3.66	
250	7.07	0.06	34.070	0.038	26.70	139.1	0.540	5.75	2.15	0.31	19.72	

BROWN BEAR CRUISE 322 STATION 060 OBSERVED VALUES									
DATE 26/04/63	HR 02.0	LAT 45-14 N	LONG 125-24 W	SEA 03	WIND VEL 16 DIR 32	WIND VEL 32 DIR 32	SEA 10	SEA 3	DIR 32
BAROM 14.0	TEMP DRY 9.8	WET 8.2	RELHU 80	WTRCLR	SNRG 2300	WEA 03	SECDI 10	SEA 3	DIR 32
CLOUD TYPE 3	AMT 6	VIS	WIRE ANGLE(S)	8, 5	8, 5	8, 5	8, 5	8, 5	8, 5
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	ML/L	ML/L	SATN
1	0	10.00	32.306	24.87	6.52	0.582	-0.025	105	
1	5	10.03	32.300	24.86	6.80	0.607	-0.051	109	
1	10	10.05	32.301	24.86	6.81	0.608	-0.052	109	
1	20	9.90	32.312	24.89	6.98	0.623	-0.065	112	
1	30	9.76	32.370	24.96	6.70	0.598	-0.038	107	
1	50	9.66	32.531	25.10	6.44	0.575	-0.015	103	
1	75	9.43	33.082	25.57	5.19	0.464	0.098	83	
1	100	9.01	33.503	25.97	3.61	0.322	0.243	57	
1	125	8.76	33.744	26.19	3.05	0.272	0.295	48	
1	149	8.60	33.812	26.27	2.79	0.249	0.320	44	
1	173	8.01	33.869	26.41	2.89	0.258	0.320	45	
2	198	7.66	33.930	26.50	2.54	0.227	0.355	39	
2	492	5.24	34.106	26.96	0.85	0.076	0.540	14	
2	738	4.25	34.267	27.20	0.36	0.032	0.598	5	
2	983	3.59	34.412	27.38	0.31	0.028	0.613	4	
2	1475	2.62	34.528	27.56	0.73	0.065	0.591	10	
2	1770	2.18	34.578	27.64	1.19	0.106	0.557	16	

BROWN BEAR CRUISE 322 STATION 060 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY	SAL
	LAB-I	DECK-I	
0	0.99	0.75	32.310
6	1.04	0.89	32.453
20	0.99	0.92	32.475
36	0.52	0.20	32.313

32.36 26.60 - WATER COLUMN VALUES

MESSANGER TIME 1700 INCOMING SOLAR RADIATION - AM 020 PM 220

BROWN BEAR			CRUISE 322			STATION 060		INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	10.00	0.00	32.306	0.000	24.87	308.8	0.000	0.00	6.52	0.00		
10	10.05	0.00	32.301	0.000	24.86	310.1	0.032	0.02	6.81	0.00		
20	9.90	0.00	32.312	0.000	24.89	307.1	0.063	0.06	6.98	0.00		
30	9.76	0.00	32.370	0.000	24.96	300.8	0.093	0.14	6.70	0.00		
50	9.66	0.00	32.531	0.000	25.10	287.7	0.153	0.38	6.44	0.00		
75	9.43	0.00	33.082	0.000	25.57	243.8	0.220	0.81	5.19	0.00		
100	9.01	0.00	33.503	0.000	25.97	206.6	0.276	1.31	3.61	0.00		
150	8.58	0.00	33.814	0.000	26.28	177.9	0.373	2.54	2.79	0.01	0.94	
200	7.64	0.00	33.933	0.001	26.51	156.3	0.457	4.04	2.52	0.00	1.06	
250	7.07	0.04	33.997	0.025	26.64	144.5	0.533	5.78	2.03	0.08	3.35	
300	6.57	0.07	34.047	0.038	26.75	134.8	0.604	7.77	1.63	0.12	5.36	
400	5.76	0.06	34.104	0.036	26.90	121.5	0.733	12.38	1.07	0.12	4.18	
500	5.20	0.00	34.111	0.000	26.97	115.2	0.852	17.89	0.82	0.00	0.95	
600	4.73	0.03	34.177	0.001	27.08	105.7	0.964	24.18	0.56	0.02	0.63	
700	4.36	0.01	34.242	0.001	27.17	97.5	1.067	31.02	0.39	0.01	0.81	
800	4.06	0.01	34.307	0.001	27.25	90.1	1.161	38.31	0.32	0.01	0.72	
1000	3.55	0.00	34.418	0.001	27.39	77.5	1.331	53.89	0.32	0.00	0.98	
1200	3.11	0.01	34.480	0.008	27.48	69.4	1.480	70.67	0.43	0.01	0.89	
1500	2.58	0.00	34.531	0.000	27.57	61.2	1.679	98.10	0.76	0.00	12.41	

BROWN BEAR CRUISE 322 STATION 061 OBSERVED VALUES
 DATE 26/04/63 HR 03.4 LAT 45-14 N LONG 125-38 W WEA 02 WIND VEL 16 DIR 33
 BAROM 15.0 TEMP DRY 9.3 WET 7.0 RELHU 73 WTRCLR SECDI SEA 2 DIR 33 SWELL 1 DIR 33
 CLOUD TYPE 8 AMT 3 VIS 8 WIRE ANGLE(S) 8

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
1	0	10.20	32.395	24.91	6.66	0.595	-0.041	107	
1	5	10.23	32.396	24.90	6.71	0.599	-0.045	108	
1	10	10.24	32.396	24.90	6.75	0.603	-0.049	109	
1	20	10.16	32.409	24.93	6.66	0.595	-0.040	107	
1	30	10.04	32.409	24.95	6.64	0.593	-0.037	107	
1	50	9.79	32.476	25.04	6.27	0.560	-0.001	100	
1	75	8.71	32.892	25.54	5.24	0.468	0.103	82	
1	100	8.61	33.410	25.96	4.22	0.377	0.194	66	
1	125	8.05	33.612	26.20	3.60	0.322	0.256	56	
1	150	7.99	33.788	26.35	3.10	0.277	0.301	48	
1	174	7.76	33.888	26.46	2.72	0.243	0.334	42	
1	199	7.62	33.983	26.55	2.26	0.202	0.380	35	
1	297	6.52	34.004	26.72	2.00	0.179	0.419	30	

BROWN BEAR CRUISE 322 STATION 061				INTERPOLATED AND COMPUTED VALUES							
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.20	0.00	32.395	0.000	24.91	305.4	0.000	0.00	6.66	0.00	
10	10.24	0.00	32.396	0.000	24.90	306.1	0.031	0.02	6.75	0.00	
20	10.16	0.00	32.409	0.000	24.93	304.1	0.062	0.06	6.66	0.00	
30	10.04	0.00	32.409	0.000	24.95	302.3	0.093	0.14	6.64	0.00	
50	9.79	0.00	32.476	0.000	25.04	293.8	0.153	0.39	6.27	0.00	
75	8.71	0.00	32.892	0.000	25.54	247.0	0.221	0.82	5.24	0.00	
100	8.61	0.00	33.410	0.000	25.96	207.5	0.278	1.33	4.22	0.00	
150	7.99	0.00	33.788	0.000	26.35	171.3	0.373	2.53	3.10	0.00	
200	7.62	0.00	33.986	0.000	26.56	152.1	0.455	3.98	2.24	0.00	5.93
250	7.31	0.05	34.051	0.009	26.65	143.9	0.530	5.70	1.93	0.07	67.73

BROWN BEAR CRUISE 322 STATION 062 OBSERVED VALUES
 DATE 26/04/63 HR 04.9 LAT 45-13 N LONG 125-52 W WEA 02 WIND VEL 10 DIR 34
 BAROM 15.0 TEMP DRY 10.0 WET 7.3 RELHU 67 WTRCLR SEA 2 DIR 34 SWELL 2 DIR 33
 CLOUD TYPE 8 AMT 3 VIS 8 WIRE ANGLE(S) ---, 5.---
 CST DEPTH TEMP SAL SIGMA-T ML/L MGA/L OXYGEN AUU SATN
 2 0 10.43 32.468 24.93 7.00 0.625 -0.074 113
 2 5 10.42 32.472 24.93 7.00 0.625 -0.078 114
 2 10 10.51 32.472 24.92 6.56 0.586 -0.036 106
 2 20 10.41 32.638 25.06 6.99 0.624 -0.074 113
 2 30 10.37 32.636 25.07 6.44 0.575 -0.024 104
 2 49 10.29 32.641 25.08 6.40 0.572 -0.019 104
 2 74 10.04 32.829 25.27 5.98 0.534 0.021 96
 2 99 9.36 33.458 25.88 3.80 0.339 0.222 60
 2 124 8.90 33.688 26.13 3.38 0.302 0.264 53
 2 144 8.52 33.835 26.30 2.91 0.260 0.310 46
 2 173 8.06 33.933 26.45 2.56 0.229 0.347 40
 3 196 7.72 33.965 26.52 2.54 0.227 0.354 39
 3 298 6.60 34.020 26.72 1.97 0.176 0.420 30
 3 483 5.08 34.099 26.97 0.94 0.084 0.534 14
 3 726 4.27 34.301 27.22 0.27 0.024 0.606 4
 3 970 3.65 34.408 27.37 0.36 0.032 0.607 5
 3 1460 2.64 34.531 27.56 0.74 0.066 0.590 10
 3 1754 2.18 34.573 27.64 1.24 0.111 0.553 17
 1 1797 2.19 34.578 27.64 1.15 0.158 0.506 24
 1 1997 1.92 34.606 27.68 1.56 0.139 0.529 21
 1 2293 1.79 34.632 27.71 1.86 0.166 0.504 25
 1 2591 1.72 34.648 27.73 1.99 0.178 0.494 26

BROWN BEAR CRUISE 322 STATION 062 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.68	0.75		32.467
6	0.64	0.73		32.493
20	0.66	0.56		32.639
36	0.78	0.60		32.642
100	0.10	0.02		

24.49 22.72 - WATER COLUMN VALUES

MESSSENGER TIME 2205 INCOMING SOLAR RADIATION - AM 220 PM 220

DEPTH	BROWN BEAR		CRUISE 322		STATION 062		INTERPOLATED AND COMPUTED VALUES					VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)		
0	10.43	0.00	32.468	0.000	24.93	303.7	0.000	0.00	7.00	0.00	0.95 0.94 0.94 0.83	
10	10.51	0.00	32.472	0.000	24.92	304.9	0.031	0.02	6.56	0.00		
20	10.41	0.00	32.638	0.000	25.06	291.1	0.061	0.06	6.99	0.00		
30	10.37	0.00	32.636	0.000	25.07	290.8	0.090	0.14	6.44	0.00		
50	10.29	0.00	32.642	0.002	25.09	289.4	0.149	0.38	6.40	0.01	0.95 0.94 0.94 0.83	
75	10.01	0.00	32.854	0.005	25.30	269.9	0.219	0.83	5.89	0.02		
100	9.34	0.00	33.472	0.002	25.89	214.0	0.280	1.36	3.77	0.01		
150	8.42	0.00	33.864	0.002	26.34	171.9	0.378	2.59	2.81	0.00		
200	7.67	0.00	33.969	0.001	26.53	154.1	0.460	4.05	2.53	0.00	1.08 1.41 0.99 0.73	
250	7.08	0.02	34.003	0.006	26.65	144.1	0.535	5.78	2.29	0.03		
300	6.58	0.00	34.021	0.000	26.73	136.9	0.606	7.78	1.96	0.00		
400	5.67	0.01	34.061	0.004	26.87	123.6	0.737	12.47	1.37	0.02		
500	5.00	0.01	34.113	0.002	26.99	112.6	0.856	17.96	0.87	0.00	0.92 0.68 0.86 0.68	
600	4.59	0.05	34.195	0.009	27.11	102.7	0.965	24.09	0.52	0.00		
700	4.32	0.02	34.279	0.003	27.20	94.3	1.065	30.72	0.31	0.00		
800	4.07	0.00	34.340	0.002	27.28	87.7	1.157	37.80	0.25	0.02		
1000	3.58	0.00	34.418	0.001	27.39	77.9	1.324	53.22	0.37	0.00	0.97 0.89 0.81 0.99	
1200	3.14	0.00	34.477	0.002	27.48	69.8	1.474	70.08	0.49	0.01		
1500	2.58	0.01	34.537	0.001	27.58	60.8	1.673	97.50	0.78	0.01		
2000	1.92	0.00	34.606	0.000	27.68	50.2	1.954	147.68	1.56	0.00		
2500	1.75	0.01	34.644	0.000	27.73	47.2	2.202	205.13	1.96	0.00	6.51	

DATE 26/04/63

HR 08.9

LAT 45-15 N

LONG 126-08 W

WIND VEL 9 DIR 32

BAROM

TEMP DRY 10.8

WET 8.3

RELHU 69

WTRCLR

SEA

CLOUD TYPE 7

AMT 0

VIS 9

WIRE ANGLE(S) 5

DIR 32

SWELL 6

DIR 30

BROWN BEAR

CRUISE 322

STATION 063

OBSERVED VALUES

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
1	0	10.26	32.432	24.93	6.66	0.595	-0.041		107
1	5	10.30	32.444	24.93	8.22	0.734	-0.181		133
1	10	10.30	32.436	24.92	6.79	0.606	-0.054		110
1	20	10.04	32.428	24.96	6.61	0.590	-0.034		106
1	30	10.01	32.448	24.98	6.47	0.578	-0.021		104
1	50	10.03	32.564	25.07	5.26	0.470	0.086		85
1	75	8.95	33.020	25.60	5.02	0.448	0.119		79
1	100	8.17	33.429	26.04	4.38	0.391	0.185		68
1	125	7.83	33.681	26.28	4.03	0.360	0.220		62
1	149	7.80	33.845	26.42	3.25	0.290	0.290		50
1	174	7.61	33.909	26.50	3.06	0.273	0.309		47
1	200	7.34	33.951	26.57	2.84	0.254	0.332		43
1	297	6.10	33.972	26.75	2.36	0.211	0.393		35

BROWN BEAR

CRUISE 322

STATION 063

BIOLOGICAL DATA

INCOMING SOLAR RADIATION - AM 312 PM 294

ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0115-0125 DEPTHS 100, 70

35, 70

DEPTH	BROWN BEAR		CRUISE 322		STATION 063		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	10.26	0.00	32.432	0.000	24.93	303.6	0.000	0.00	6.66	0.00	0.94	
10	10.30	0.00	32.436	0.000	24.92	304.1	0.031	0.02	6.79	0.00		
20	10.04	0.00	32.428	0.000	24.96	300.7	0.062	0.06	6.61	0.00		
30	10.01	0.00	32.448	0.000	24.98	299.0	0.092	0.14	6.47	0.00		
50	10.03	0.00	32.564	0.000	25.07	291.1	0.151	0.38	5.26	0.00	58.84	
75	8.95	0.00	33.020	0.000	25.60	241.0	0.218	0.81	5.02	0.00		
100	8.17	0.00	33.429	0.000	26.04	199.7	0.274	1.30	4.38	0.00		
150	7.79	0.00	33.849	0.001	26.42	164.0	0.365	2.45	3.24	0.00		
200	7.34	0.00	33.951	0.000	26.57	150.9	0.445	3.87	2.84	0.00	58.84	
250	6.70	0.01	33.993	0.003	26.69	139.9	0.518	5.56	2.47	0.02		

BROWN BEAR CRUISE 322 STATION 064 OBSERVED VALUES

DATE 26/04/63		HR 12.9	LAT 45-14 N	LONG 126-21 W	WEA 20	WIND VEL 16 DIR 32		
BAROM 15.0		TEMP DRY 8.7	WET 7.2	RELHU 79	SEA 2 DIR 30	SWELL 6 DIR 30		
CLOUD TYPE 7		AMT 0	VIS	WIRE ANGLE(S) 5.15				
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN MGA/L	AOU	SATN
1	0	10.22	32.447	24.95	6.73	0.601	-0.047	109
1	5	10.24	32.465	24.96	6.71	0.599	-0.046	108
1	10	10.27	32.463	24.95	6.91	0.617	-0.064	112
1	20	10.27	32.463	24.95	6.56	0.586	-0.033	106
1	30	10.13	32.455	24.97	6.71	0.599	-0.044	108
1	49	9.93	32.489	25.03	6.41	0.573	-0.015	103
1	74	9.42	32.912	25.44	5.47	0.489	0.074	87
1	99	8.92	33.431	25.92	4.28	0.382	0.184	67
1	124	8.52	33.689	26.19	3.54	0.316	0.255	55
1	149	7.97	33.824	26.38	3.25	0.290	0.287	50
1	173	7.79	33.921	26.48	2.59	0.231	0.348	40
2	193	7.52	33.924	26.52	3.12	0.279	0.304	48
2	289	6.51	34.007	26.72	1.96	0.175	0.422	29
2	483	5.05	34.130	27.00	0.80	0.071	0.547	12
2	727	4.18	34.280	27.21	0.32	0.029	0.603	5
2	969	3.61	34.403	27.37	0.32	0.029	0.612	4
2	1461	2.62	34.531	27.57	0.71	0.063	0.593	10
2	1756	2.15	34.575	27.64	1.15	0.103	0.561	15

BROWN BEAR CRUISE 322 STATION 064 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I
0	1.14	1.27	9.50
6	1.12	1.38	
20	1.11	1.12	
36	1.06	0.89	
100	0.12	0.04	

39.81 41.53 - WATER COLUMN VALUES

MESSSENGER TIME 0434 INCOMING SOLAR RADIATION - AM 312 PM 294

DEPTH	BROWN BEAR		CRUISE 322		STATION 064		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	10.22	0.00	32.447	0.000	24.95	301.8	0.000	0.00	6.73	0.00		
10	10.27	0.00	32.463	0.000	24.95	301.6	0.031	0.02	6.91	0.00		
20	10.27	0.00	32.463	0.000	24.95	301.8	0.061	0.06	6.56	0.00		
30	10.13	0.00	32.455	0.000	24.97	300.4	0.092	0.14	6.71	0.00		
50	9.91	0.00	32.501	0.002	25.04	293.9	0.151	0.39	6.38	0.00	0.95	
75	9.40	0.00	32.934	0.002	25.46	254.2	0.221	0.82	5.42	0.00	0.94	
100	8.90	0.00	33.445	0.001	25.94	209.3	0.279	1.34	4.24	0.00	0.94	
150	7.96	0.00	33.829	0.000	26.38	167.8	0.374	2.53	3.21	0.01	0.94	
200	7.44	0.00	33.928	0.001	26.54	153.9	0.455	3.98	3.13	0.07	1.18	
250	6.88	0.01	33.967	0.005	26.64	144.2	0.530	5.71	2.78	0.26	1.43	
300	6.41	0.00	34.015	0.001	26.74	135.1	0.601	7.70	1.86	0.01	0.98	
400	5.59	0.00	34.081	0.002	26.90	121.0	0.730	12.31	1.16	0.04	0.76	
500	4.97	0.01	34.141	0.000	27.02	110.2	0.846	17.68	0.74	0.01	0.92	
600	4.55	0.03	34.204	0.001	27.12	101.6	0.953	23.70	0.47	0.03	0.68	
700	4.24	0.01	34.264	0.000	27.20	94.5	1.052	30.30	0.33	0.01	0.85	
800	3.99	0.01	34.321	0.000	27.27	88.2	1.145	37.42	0.29	0.01	0.68	
1000	3.54	0.00	34.414	0.001	27.39	77.7	1.313	52.86	0.33	0.00	0.97	
1200	3.12	0.00	34.478	0.004	27.48	69.6	1.462	69.67	0.44	0.00	0.90	
1500	2.55	0.00	34.537	0.000	27.58	60.5	1.660	96.97	0.76	0.00	12.13	

BROWN BEAR CRUISE 322 STATION 066 OBSERVED VALUES
 DATE 26/04/63 HR 17.8 LAT 45-14 N LONG 126-48 W SNG 2743 WEA 01 WIND VEL 14 DIR 31
 BAROM 17.0 TEMP DRY 9.4 WET 7.7 RELHU 80 WTRCLR SECDI 11 SEA 3 DIR 31 SWELL 3 DIR 32
 CLOUD TYPE 8 AMT 2 VIS 8 WIRE ANGLE(S) 5, 5

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
2	0	10.24	32.470	24.96	6.90	0.616	-0.063		111
2	5	10.25	32.458	24.95	7.11	0.635	-0.082		115
2	10	10.25	32.456	24.95	6.82	0.609	-0.056		110
2	20	10.20	32.457	24.96	7.22	0.645	-0.091		116
2	30	10.05	32.500	25.02	6.64	0.593	-0.037		107
2	49	10.02	32.570	25.07	6.41	0.573	-0.017		103
2	74	9.52	33.160	25.62	5.14	0.459	0.101		82
2	99	8.85	33.554	26.03	4.12	0.368	0.199		65
2	124	8.46	33.767	26.26	3.32	0.297	0.275		52
2	148	8.04	33.874	26.41	2.77	0.247	0.329		43
2	173	7.75	33.937	26.50	2.48	0.221	0.359		38
1	199	7.40	33.943	26.55	2.51	0.224	0.361		38
1	296	6.25	34.021	26.77	1.87	0.167	0.434		28
1	493	4.95	34.136	27.02	0.80	0.071	0.552		11
1	739	4.13	34.288	27.23	0.36	0.032	0.600		5
1	985	3.50	34.398	27.38	0.37	0.033	0.609		5
1	1478	2.52	34.537	27.58	0.78	0.070	0.588		11
1	1774	2.11	34.575	27.64	1.30	0.116	0.549		17

BROWN BEAR		CRUISE 322	STATION 066	BIOLOGICAL DATA						
DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	LIGHT PROD	SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	0.88	1.16	15.72	1.59	100	50	32.441	0.58	0.7	3
4	0.91	1.04	4.64	1.41	66		32.442	0.64	0.7	3
				1.20	49					
				1.01	35					
				0.57	16					
				0.07	5					
17		1.44	2.82			10	32.438	0.64	0.6	2
31	0.94	0.60	0.00			1	32.502	0.75	2.1	4
28.61	34.88	108.96	-	WATER COLUMN VALUES						
MESSENGER TIME 1121		INCOMING SOLAR RADIATION - AM 312		PM 294						
LIGHT SATURATION INCUBATOR ILLUMINATION 19100										

DEPTH	BROWN BEAR		CRUISE 322		STATION 066		INTERPOLATED AND COMPUTED VALUES					VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)		
0	10.24	0.00	32.470	0.000	24.96	300.4	0.000	0.00	6.90	0.00		
0	10.24	0.00	32.470	0.000	24.96	300.4	0.000	0.00	6.90	0.00		
10	10.25	0.00	32.456	0.000	24.95	301.8	0.031	0.02	6.82	0.00		
20	10.20	0.00	32.457	0.000	24.96	301.1	0.061	0.06	7.22	0.00		
30	10.05	0.00	32.500	0.000	25.02	295.8	0.091	0.14	6.64	0.00		
50	10.01	0.00	32.590	0.005	25.09	288.8	0.150	0.38	6.37	0.01	0.95	
75	9.49	0.00	33.179	0.000	25.64	237.5	0.216	0.80	5.09	0.00	0.94	
100	8.83	0.00	33.565	0.000	26.04	199.3	0.271	1.29	4.08	0.00	0.94	
150	8.01	0.00	33.881	0.000	26.41	164.8	0.363	2.44	2.74	0.00	0.89	
200	7.39	0.00	33.944	0.000	26.55	152.1	0.443	3.87	2.51	0.00	1.01	
250	6.76	0.00	33.979	0.004	26.67	141.6	0.517	5.57	2.24	0.05	1.18	
300	6.21	0.00	34.024	0.000	26.78	131.9	0.586	7.52	1.84	0.00	0.99	
400	5.44	0.03	34.085	0.003	26.92	118.9	0.713	12.04	1.25	0.01	0.78	
500	4.92	0.00	34.141	0.000	27.03	109.6	0.828	17.35	0.78	0.00	0.97	
600	4.53	0.03	34.204	0.002	27.12	101.3	0.935	23.35	0.52	0.02	0.68	
700	4.22	0.02	34.265	0.001	27.20	94.2	1.033	29.94	0.38	0.01	0.81	
800	3.96	0.00	34.318	0.000	27.27	88.1	1.125	37.03	0.34	0.01	0.73	
1000	3.46	0.00	34.404	0.000	27.39	77.6	1.293	52.45	0.37	0.00	0.98	
1200	3.03	0.00	34.471	0.001	27.48	69.0	1.442	69.19	0.48	0.00	0.89	
1500	2.48	0.00	34.541	0.000	27.59	59.4	1.637	96.14	0.81	0.00	12.48	

DATE 26/04/63 HR 21.0 LAT 45-14 N LONG 127-03 W
 BAROM 18.0 TEMP DRY 12.8 WET 8.6 RELHU 59 WTRCLR
 CLOUD TYPE 8 AMT 2 VIS 9 WIRE ANGLE(S) 7
 SNDG 2800 WEA 00 WIND VEL 7 DIR 32
 SECDI SEA 2 DIR 32 SWELL 2 DIR 32

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	SATN
					MGA/L	AOU	
1	0	10.64	32.531	24.94	6.81	0.608	111
1	5	10.60	32.528	24.94	6.85	0.612	111
1	10	10.40			6.90	0.616	
1	20	10.27	32.531	25.00	7.52	0.672	121
1	30	10.11	32.566	25.06	6.72	0.600	108
1	50	9.96	32.572	25.09	6.50	0.581	104
1	75	9.55	32.918	25.42	5.44	0.486	87
1	100	9.11	33.476	25.93	4.16	0.372	66
1	125	8.66	33.742	26.21	3.23	0.288	51
1	149	8.28	33.840	26.34	2.74	0.245	43
1	175	7.86	33.930	26.48	2.61	0.233	40
1	199	7.57	33.963	26.54	2.65	0.237	41
1	296	6.43	33.991	26.72	2.23	0.199	33

BROWN BEAR CRUISE 322 STATION 067 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEO POT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.64	0.00	32.531	0.000	24.94	302.4	0.000	0.00	6.81	0.00	
10	10.40	0.00	32.525	0.002	24.98	299.2	0.031	0.02	6.90	0.00	1.12
20	10.27	0.00	32.531	0.000	25.00	296.8	0.061	0.06	7.52	0.00	
30	10.11	0.00	32.566	0.000	25.06	291.8	0.090	0.14	6.72	0.00	
50	9.96	0.00	32.572	0.000	25.09	289.4	0.149	0.38	6.50	0.00	
75	9.55	0.00	32.918	0.000	25.42	257.8	0.218	0.82	5.44	0.00	
100	9.11	0.00	33.476	0.000	25.93	210.1	0.277	1.34	4.16	0.00	
150	8.26	0.00	33.844	0.000	26.35	171.1	0.373	2.55	2.73	0.00	0.95
200	7.56	0.00	33.964	0.000	26.55	153.0	0.455	4.00	2.58	0.05	5.15
250	7.06	0.03	34.018	0.013	26.66	142.8	0.529	5.72	2.44	0.07	59.51

BROWN BEAR CRUISE 322 STATION 068 OBSERVED VALUES
 DATE 26/04/63 HR 23.1 LAT 45-14 N LONG 127-18 W SNGD 2789 WEA 01 WIND VEL 9 DIR 32
 BAROM 19.0 TEMP DRY 11.1 WET 7.8 RELHU 63 WTRCLR SECDI 11 SEA 4 DIR 32 SWELL 4 DIR 32
 CLOUD TYPE 3 AMT 2 VIS 9 WIRE ANGLE(S) 15, 8

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN
2	0	10.64	32.520	24.93	6.87	0.614	-0.065	112
2	5	10.65	32.515	24.93	6.81	0.608	-0.060	111
2	10	10.31	32.510	24.98	6.85	0.612	-0.059	111
2	20	10.19	32.517	25.01	6.88	0.614	-0.061	111
2	30	9.97	32.520	25.04	6.61	0.590	-0.034	106
2	49	9.82	32.526	25.07	6.46	0.577	-0.018	103
2	74	9.25	33.060	25.58	4.97	0.444	0.120	79
2	99	8.86	33.533	26.01	3.75	0.335	0.232	59
2	125	8.34	33.748	26.26	3.11	0.278	0.295	48
2	149	7.92	33.855	26.41	2.83	0.253	0.325	44
2	173	7.62	33.949	26.53	2.54	0.227	0.355	39
1	184	7.54	33.964	26.55	2.56	0.229	0.354	39
1	277	6.44	34.010	26.74	2.14	0.191	0.407	32
1	465	5.09	34.092	26.97	1.01	0.090	0.528	15
1	706	4.17	34.197	27.15	0.36	0.032	0.600	5
1	946	3.68	34.372	27.34	0.30	0.027	0.612	4
1	1431	2.60	34.527	27.57	0.64	0.057	0.599	9
1	1722	2.12	34.574	27.64	1.03	0.092	0.576	14

BROWN BEAR CRUISE 322 STATION 068 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.78	0.76		32.531
4	0.93	0.88		32.528
17	0.99	0.68		32.447
31	0.91	0.36		32.549

29.19 20.72 - WATER COLUMN VALUES

MESSANGER TIME 1546 INCOMING SOLAR RADIATION - AM 312 PM 294

BROWN BEAR CRUISE 322 STATION 068				INTERPOLATED AND COMPUTED VALUES							
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.64	0.00	32.520	0.000	24.93	303.2	0.000	0.00	6.87	0.00	
10	10.31	0.00	32.510	0.000	24.98	298.8	0.031	0.02	6.85	0.00	
20	10.19	0.00	32.517	0.000	25.01	296.5	0.061	0.06	6.88	0.00	
30	9.97	0.00	32.520	0.000	25.04	293.0	0.090	0.14	6.61	0.00	
50	9.80	0.00	32.542	0.004	25.09	289.0	0.149	0.38	6.41	0.01	0.95
75	9.23	0.00	33.082	0.001	25.60	240.7	0.216	0.80	4.91	0.00	0.94
100	8.84	0.00	33.545	0.001	26.03	200.9	0.271	1.29	3.72	0.00	0.95
150	7.91	0.00	33.859	0.000	26.41	164.8	0.364	2.45	2.82	0.00	0.96
200	7.31	0.01	33.996	0.016	26.61	147.2	0.442	3.85	2.40	0.06	1.53
250	6.73	0.00	34.023	0.017	26.71	138.0	0.514	5.51	2.19	0.05	1.03
300	6.23	0.01	34.020	0.000	26.77	132.4	0.582	7.43	2.00	0.02	0.95
400	5.46	0.02	34.064	0.001	26.90	120.7	0.710	12.00	1.39	0.03	0.74
500	4.91	0.01	34.105	0.001	27.00	112.2	0.828	17.41	0.87	0.01	0.85
600	4.49	0.02	34.146	0.003	27.08	105.2	0.937	23.60	0.55	0.01	0.68
700	4.18	0.00	34.194	0.000	27.15	99.0	1.041	30.48	0.37	0.00	0.96
800	3.95	0.02	34.265	0.005	27.23	91.9	1.137	37.91	0.29	0.02	0.63
1000	3.55	0.01	34.398	0.003	27.37	79.1	1.310	53.81	0.31	0.00	0.95
1200	3.10	0.02	34.476	0.007	27.48	69.5	1.461	70.76	0.42	0.01	0.89
1500	2.47	0.00	34.538	0.001	27.59	59.4	1.657	97.80	0.72	0.00	10.60

BROWN BEAR CRUISE 322 STATION 069 OBSERVED VALUES
 DATE 27/04/63 HR 01.9 LAT 45-14 N LONG 127-30 W WEA 02 WIND VEL 9 DIR 31
 BAROM 19.0 TEMP DRY 9.7 WET 6.9 RELHU 67 WTRCLR SECDI 2780 SEA 1 DIR 31 SWELL 1 DIR 34
 CLOUD TYPE 8 AMT 6 VIS 7 WIRE ANGLE(S) 10

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN
					MGA/L			
1	0	10.34	32.569	25.02	7.40	0.661	-0.109	120
1	5	10.36	32.574	25.02	6.82	0.609	-0.057	110
1	10	10.21	32.568	25.04	6.81	0.608	-0.055	110
1	20	10.13	32.583	25.07	6.90	0.616	-0.062	111
1	30	10.10	32.589	25.08	6.63	0.592	-0.037	107
1	50	10.01	32.612	25.11	6.56	0.586	-0.030	105
1	75	8.98	33.254	25.78	4.50	0.402	0.165	71
1	100	8.52	33.631	26.14	3.55	0.317	0.254	56
1	125	8.25	33.860	26.36	3.36	0.300	0.274	52
1	150	7.76	33.914	26.48	3.09	0.276	0.304	48
1	175	7.42	33.964	26.57	2.69	0.240	0.344	41
1	199	7.03	33.990	26.64	2.58	0.230	0.359	39
1	296	6.20	34.043	26.79	1.87	0.167	0.435	28

BROWN BEAR			CRUISE 322			STATION 069			INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO		
0	10.34	0.00	32.569	0.000	25.02	294.7	0.000	0.00	7.40	0.00			
10	10.21	0.00	32.568	0.000	25.04	292.9	0.030	0.02	6.81	0.00			
20	10.13	0.00	32.583	0.000	25.07	290.7	0.059	0.06	6.90	0.00			
30	10.10	0.00	32.589	0.000	25.08	290.0	0.089	0.14	6.63	0.00			
50	10.01	0.00	32.612	0.000	25.11	287.2	0.147	0.37	6.56	0.00			
75	8.98	0.00	33.254	0.000	25.78	224.1	0.211	0.78	4.50	0.00			
100	8.52	0.00	33.631	0.000	26.14	189.8	0.263	1.24	3.55	0.00			
150	7.76	0.00	33.914	0.000	26.48	158.7	0.351	2.35	3.09	0.00			
200	7.01	0.00	33.991	0.000	26.64	143.5	0.427	3.71	2.58	0.00	5.39		
250	6.30	0.05	34.011	0.006	26.75	133.3	0.497	5.31	2.57	0.10	63.80		

BROWN BEAR CRUISE 322 STATION 070 OBSERVED VALUES
 DATE 27/04/63 HR 03.7 LAT 45-15 N LONG 127-45 W WEA 03 WIND VEL 14 DIR 25
 BAROM 20.0 TEMP DRY 9.9 WET 7.8 RELHU 74 WTRCLR SECDI 2880 SEA 1 DIR 25 SWELL 1 DIR 25
 CLOUD TYPE 8 AMT 6 VIS 7 WIRE ANGLE(S) 5,10

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	ADU	SATN
					MGA/L			
2	0	10.39	32.636	25.06	6.18	0.552	-0.001	100
2	5	10.38	32.621	25.05	6.51	0.581	-0.030	105
2	10	10.36	32.622	25.06	6.76	0.604	-0.052	109
2	20	10.21	32.604	25.07	6.81	0.608	-0.055	110
2	29	10.04	32.618	25.11	6.78	0.606	-0.050	109
2	49	9.88	32.624	25.14	6.47	0.578	-0.020	104
2	74	9.14	33.285	25.78	4.61	0.412	0.153	73
2	98	8.42	33.602	26.14	3.62	0.323	0.249	56
2	123	8.35	33.790	26.29	3.14	0.280	0.292	49
2	147	8.03	33.878	26.41	2.89	0.258	0.318	45
2	171	7.51	33.918	26.52	2.74	0.245	0.338	42
1	190	7.22	33.956	26.59	2.59	0.231	0.356	39
1	284	6.23	33.991	26.75	2.03	0.181	0.420	30
1	477	5.05	34.096	26.98	0.91	0.081	0.537	13
1	723	4.20	34.274	27.21	0.31	0.028	0.604	4
1	962	3.56	34.410	27.38	0.39	0.035	0.606	5
1	1450	2.55	34.511	27.56	0.76	0.068	0.590	10
1	1744	2.13	34.567	27.64	1.19	0.106	0.558	16

BIOLOGICAL DATA

STATION 070

CRUISE 322

BROWN BEAR

DEPTH

CHL-A

PRODUCTIVITY
LAB-I DECK-I

SAL

0	0.21	0.23	32.544
4	0.23	0.28	32.554
17	0.21	0.16	32.620
31	0.19	0.16	32.620
100	0.06	0.03	33.617

WATER COLUMN VALUES

-

6.64

6.16

MESSENGER TIME 2104

INCOMING SOLAR RADIATION - AM 312 PM 294

DEPTH	BROWN BEAR		CRUISE 322		STATION 070		INTERPOLATED AND COMPUTED VALUES					VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)		
0	10.39	0.00	32.636	0.000	25.06	290.6	0.000	0.00	6.18	0.00	0.99	
10	10.36	0.00	32.622	0.000	25.06	291.3	0.030	0.02	6.76	0.00		
20	10.21	0.00	32.604	0.000	25.07	290.4	0.059	0.06	6.81	0.00		
30	10.03	0.01	32.613	0.004	25.11	287.1	0.088	0.14	6.78	0.01		
50	9.86	0.00	32.647	0.007	25.16	282.2	0.146	0.37	6.40	0.02	0.95	
75	9.10	0.00	33.303	0.001	25.80	222.4	0.209	0.77	4.56	0.00	0.94	
100	8.41	0.01	33.622	0.001	26.15	188.8	0.261	1.23	3.57	0.00	0.89	
150	7.97	0.01	33.884	0.001	26.42	163.8	0.350	2.35	2.87	0.00	0.84	
200	7.09	0.01	33.966	0.004	26.61	146.4	0.428	3.75	2.52	0.00	1.29	
250	6.53	0.02	33.992	0.010	26.71	137.7	0.500	5.40	2.21	0.01	1.39	
300	6.10	0.01	33.998	0.000	26.77	132.4	0.568	7.32	1.93	0.01	0.97	
400	5.42	0.03	34.050	0.001	26.89	121.4	0.696	11.89	1.32	0.02	0.76	
500	4.95	0.01	34.112	0.001	27.00	112.1	0.813	17.32	0.82	0.00	0.30	
600	4.57	0.02	34.184	0.004	27.10	103.2	0.922	23.45	0.51	0.01	0.68	
700	4.26	0.01	34.257	0.001	27.19	95.2	1.023	30.13	0.33	0.00	0.88	
800	3.98	0.00	34.323	0.001	27.27	87.9	1.115	37.26	0.30	0.02	0.67	
1000	3.47	0.00	34.422	0.003	27.40	76.3	1.281	52.53	0.41	0.00	0.96	
1200	3.02	0.00	34.475	0.009	27.49	68.7	1.428	69.08	0.53	0.01	0.89	
1500	2.47	0.00	34.518	0.001	27.57	60.9	1.625	96.32	0.82	0.00	1.76	

BROWN BEAR CRUISE 322 STATION 071 OBSERVED VALUES
 DATE 27/04/63 HR 06.7 LAT 45-14 N LONG 127-59 W WIND VEL 14 DIR 22
 BAROM DRY 10.0 WET 8.2 RELHU 80 WTRCLR SNRG 2844 WEA DIR 22 SWELL 1 DIR 21
 CLOUD TYPE 8 AMT 7 VIS WIRE ANGLE(S) 5 SEA SECDI
 CST DEPTH TEMP SAL SIGMA-T ML/L OXYGEN MGA/L AOU SATN
 1 0 10.42 32.495 24.95 6.85 0.612 -0.061 111
 1 5 10.45 32.490 24.94 6.69 0.598 -0.047 108
 1 10 10.46 32.478 24.93 6.85 0.612 -0.061 111
 1 20 10.27 32.590 25.05 6.63 0.592 -0.039 107
 1 30 10.18 32.600 25.07 6.69 0.598 -0.044 108
 1 49 9.97 32.641 25.14 6.34 0.566 -0.010 102
 1 74 9.40 33.110 25.60 5.15 0.460 0.102 82
 1 99 8.56 33.488 26.02 3.80 0.339 0.232 59
 1 124 8.09 33.678 26.24 3.26 0.291 0.285 50
 1 148 7.89 33.818 26.38 3.30 0.295 0.284 51
 1 173 7.70 33.877 26.46 2.95 0.263 0.318 45
 1 198 7.44 33.920 26.53 2.81 0.251 0.333 43
 1 296 6.60 33.984 26.69 2.06 0.184 0.412 31

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BROWN BEAR CRUISE 322 STATION 071 INTERPOLATED AND COMPUTED VALUES
 DEPTH TEMP E(T) SAL E(S) SIGMA-T SP VOL GEOPOT POT OXY VAR
 0 10.42 0.00 32.495 0.000 24.95 301.5 0.000 0.00 6.85 0.00
 10 10.46 0.00 32.478 0.000 24.93 303.6 0.031 0.00 6.85 0.00
 20 10.27 0.00 32.590 0.000 25.05 292.4 0.061 0.00 6.63 0.00
 30 10.18 0.00 32.600 0.000 25.07 290.4 0.090 0.00 6.69 0.00
 50 9.95 0.00 32.656 0.004 25.15 283.0 0.148 0.37 6.30 0.95
 75 9.37 0.00 33.128 0.001 25.62 239.4 0.214 0.79 5.09 0.94
 100 8.54 0.00 33.498 0.001 26.04 199.9 0.269 1.28 3.76 0.94
 150 7.88 0.00 33.825 0.001 26.39 166.9 0.362 2.45 3.28 0.89
 200 7.42 0.00 33.923 0.000 26.53 154.0 0.443 3.89 2.80 6.32
 250 6.87 0.03 33.970 0.002 26.65 143.9 0.518 5.62 2.68 63.09

BROWN BEAR CRUISE 322 STATION 072 OBSERVED VALUES
 DATE 27/04/63 HR 09.7 LAT 45-29 N LONG 128-17 W WEA 50 WIND VEL 17 DIR 19
 BAROM 46.0 TEMP DRY 10.4 WET 8.9 RELHU 81 WTRCLR SEA 2 DIR 22 SWELL 2 DIR 22
 CLOUD TYPE VIS WIRE ANGLE(S) 18.00

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
2	0	9.94	32.504	25.04	6.73	0.601	-0.044	108	
2	5	9.96	32.507	25.04	6.88	0.614	-0.058	110	
2	10	9.98	32.498	25.03	6.83	0.610	-0.053	110	
2	20	9.91	32.503	25.04	6.72	0.600	-0.043	108	
2	29	9.78	32.510	25.07	6.65	0.594	-0.035	106	
2	49	9.63	32.502	25.09	6.66	0.595	-0.034	106	
2	74		32.541		6.65	0.594			
2	99	8.69	33.330	25.88	4.20	0.375	0.195	66	
2	124	8.21	33.658	26.21	3.37	0.301	0.274	52	
2	148	7.96	33.778	26.34	3.01	0.269	0.309	47	
2	171	7.69	33.899	26.48	2.69	0.240	0.341	41	
1	188	7.47	33.938	26.54	2.45	0.219	0.365	37	
1	281	6.49	33.994	26.72	2.05	0.183	0.415	31	
1	472	5.08	34.086	26.96	0.99	0.098	0.530	14	
1	711	4.22	34.276	27.21	0.32	0.029	0.602	5	
1	944	3.66	34.397	27.36	0.29	0.026	0.614	4	
1	1440	2.62	34.506	27.55	0.62	0.055	0.601	8	
1	1732	2.17	34.569	27.63	1.10	0.098	0.566	15	

BROWN BEAR CRUISE 322 STATION 072 BIOLOGICAL DATA
 INCOMING SOLAR RADIATION - AM 118 PM
 ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0250-0300 DEPTHS 100, 70
 35, 0

BROWN BEAR			CRUISE 322			STATION 072			INTERPOLATED AND COMPUTED VALUES					
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO			
0	9.94	0.00	32.504	0.000	25.04	293.2	0.000	0.00	6.73	0.00	1.00			
10	9.98	0.00	32.498	0.000	25.03	294.4	0.030	0.02	6.83	0.00	1.00			
20	9.91	0.00	32.503	0.000	25.04	293.1	0.060	0.06	6.72	0.00	1.00			
30	9.77	0.00	32.510	0.001	25.07	290.7	0.089	0.14	6.65	0.00	1.00			
50	9.62	0.00	32.496	0.004	25.08	289.6	0.148	0.38	6.68	0.02	1.00			
75	9.19	0.03	32.570	0.008	25.21	278.1	0.219	0.83	6.56	0.03	1.04			
100	8.67	0.00	33.350	0.002	25.90	212.8	0.281	1.38	4.15	0.01	0.94			
150	7.74	0.00	33.790	0.001	26.35	170.4	0.377	2.59	2.98	0.00	0.68			
200	7.33	0.00	33.953	0.005	26.57	150.6	0.458	4.03	2.36	0.03	1.43			
250	6.78	0.01	33.991	0.010	26.67	141.2	0.532	5.73	2.10	0.06	1.48			
300	6.32	0.00	34.003	0.001	26.75	134.8	0.601	7.69	1.94	0.01	0.96			
400	5.53	0.01	34.050	0.003	26.88	122.6	0.731	12.33	1.38	0.03	0.76			
500	4.95	0.01	34.108	0.003	27.00	112.4	0.850	17.79	0.88	0.00	0.87			
600	4.54	0.03	34.187	0.006	27.10	102.7	0.959	23.91	0.55	0.00	0.67			
700	4.25	0.01	34.267	0.001	27.20	94.3	1.058	30.54	0.34	0.00	0.93			
800	3.99	0.01	34.329	0.001	27.28	87.6	1.150	37.62	0.27	0.02	0.63			
1000	3.53	0.00	34.414	0.003	27.39	77.6	1.317	53.00	0.30	0.00	0.96			
1200	3.09	0.01	34.466	0.008	27.47	70.1	1.467	69.86	0.39	0.00	0.91			
1500	2.52	0.00	34.516	0.001	27.56	61.6	1.667	97.53	0.70	0.00	11.92			

BROWN BEAR CRUISE 322 STATION 72A BIOLOGICAL DATA

DATE 27/04/63 LAT 45-40 N LONG 128-26 W

DEPTH	CHL-A	PRODUCTIVITY	SAL
0	0.40	0.77	5.08
			32.576

MESSENGER TIME 0450 INCOMING SOLAR RADIATION - AM 118 PM

	BROWN BEAR	Cruise	322	Station	073	OBSERVED VALUES	
DATE	27/04/63	HR	13-8	LAT	45-44 N	LONG	128-30 W
TEMP	DRY 2C-0			WET	-9-9	RELHU	94
BAROM							WTICLR
CLOUD TYPE	TYPE 8	AMT	9	VIS	6	WIRE ANGLE(S)	10
SNDG	2706	WEA	52	SEA	2	DIR	17 SWELL 1 DIR 28
SECDI							
WIND VEL	14	DIR	17				

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	MGA/L	SATN
1	0	9.91	32.524	25.06	6.50	-0.581	0.023	104
1	5	9.93	32.526	25.06	6.82	-0.609	0.052	109
1	10	9.95	32.526	25.05	6.76	-0.604	0.047	108
1	19	9.95	32.529	25.05	6.62	-0.591	0.034	106
1	29	9.82	32.520	25.07	6.70	-0.598	0.040	107
1	48	9.66	32.525	25.10	6.59	-0.589	0.028	105
1	72	9.57	32.529	25.12	6.50	-0.581	0.019	103
1	95	8.69	32.993	25.62	5.47	-0.489	0.083	86
1	119	8.12	33.372	26.00	4.51	-0.403	0.175	70
1	143	7.54	33.589	26.25	4.49	-0.401	0.183	69
1	167	7.50	33.792	26.42	3.83	-0.342	0.242	59
1	191	7.26	33.871	26.51	3.77	-0.337	0.250	57
1	283	5.81	33.929	26.75	2.61	-0.233	0.375	38

BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.48	0.65		32.532
4	0.54	0.52		32.541
17		0.68		32.537
31	0.58	0.45		32.536
	17.16	18.17	-	WATER COLUMN VALUES

MESSANGER TIME 0609 INCOMING SOLAR RADIATION - AM 118 PM

DEPTH	BROWN BEAR		CRUISE 322		STATION 073		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	9.91	0.00	32.524	0.000	25.06	291.2	0.000	0.00	6.50	0.00		
10	9.95	0.00	32.526	0.000	25.05	291.9	0.030	0.02	6.76	0.00		
20	9.94	0.00	32.528	0.000	25.06	291.7	0.059	0.06	6.62	0.01	0.88	
30	9.81	0.00	32.520	0.000	25.07	290.5	0.089	0.14	6.70	0.00	0.97	
50	9.67	0.01	32.516	0.006	25.09	288.9	0.147	0.38	6.60	0.01	0.91	
75	9.47	0.02	32.580	0.010	25.17	281.6	0.219	0.84	6.39	0.02	0.83	
100	8.56	0.01	33.083	0.002	25.71	231.0	0.283	1.41	5.23	0.02	0.77	
150	7.51	0.02	33.655	0.004	26.31	174.4	0.385	2.68	4.30	0.04	0.70	
200	7.16	0.01	33.879	0.005	26.54	153.8	0.468	4.16	3.44	0.19	12.84	
250	6.34	0.04	33.855	0.033	26.63	145.4	0.544	5.89	2.91	0.19	54.51	

BROWN BEAR CRUISE 322 STATION 074 OBSERVED VALUES
 DATE 27/04/63 HR 18.0 LAT 45-60 N LONG 128-15 W SNRG 2743 WEA 50 WIND VEL 16 DIR 17
 BAROM 21.0 TEMP DRY 10.6 WET 10.3 RELHU 94 WTRCLR SEA 1 DIR 17 SWELL 1 DIR 15
 CLOUD TYPE 8 AMT 9 VIS 6 WIRE ANGLE(S) 17, ---

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN
					MGA/L			
2	0	9.84	32.498	25.05	6.72	0.600	-0.042	107
2	5	9.84	32.499	25.05	6.68	0.597	-0.038	107
2	10	9.86	32.515	25.06	6.71	0.599	-0.041	107
2	20	9.87	32.512	25.05	6.70	0.598	-0.040	107
2	30	9.77	32.520	25.08	6.63	0.592	-0.033	106
2	49	9.49	32.525	25.13	6.70	0.598	-0.021	104
2	74	9.46	32.525	25.38	6.54	0.584	0.024	96
2	99	8.71	32.693	25.38	6.14	0.548	0.024	96
2	124	8.56	33.138	25.75	5.69	0.508	0.064	89
2	150	7.59	33.569	26.23	3.90	0.348	0.236	60
2	174	7.49	33.824	26.45	3.35	0.299	0.285	51
1	190	7.28	33.866	26.51	3.30	0.295	0.292	50
1	286	5.99	33.974	26.77	2.36	0.211	0.394	35
1	475	4.85	34.071	26.98	0.96	0.013	0.536	14
1	714	4.04	34.239	27.20	0.32	0.019	0.605	5
1	954	3.46	34.347	27.34	0.30	0.017	0.616	4
1	1435	2.51	34.498	27.55	0.65	0.058	0.600	9
1	1725	2.15	34.559	27.63	1.06	0.093	0.569	14

BROWN BEAR CRUISE 322 STATION 074 BIOLOGICAL DATA										
DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	LIGHT PROD	SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	0.32	0.55	3.12				32.506	0.88	2.8	5
8	0.33	0.45	4.82			50	32.502	0.87	2.8	5
24	0.28	0.31	0.58	0.46	100	10	32.502	0.86	3.0	5
				0.40	66					
				0.34	49					
				0.28	35					
				0.12	16					
				0.03	5					
40	0.41	0.36	0.00			1	32.510	0.94	3.1	6
12.99		15.49	79.60	- WATER COLUMN VALUES						
MESSENGER TIME 1112 INCOMING SOLAR RADIATION - AM 118 PM										
LIGHT SATURATION INCUBATOR ILLUMINATION 19000										

12.99 15.49 79.60 - WATER COLUMN VALUES

MESSENGER TIME 1112 INCOMING SOLAR RADIATION - AM 118 PM

LIGHT SATURATION INCUBATOR ILLUMINATION 19000

DEPTH	BROWN BEAR		CRUISE 322		STATION 074		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	9.84	0.00	32.498	0.000	25.05	292.0	0.000	0.00	6.72	0.00		
10	9.86	0.00	32.515	0.000	25.06	291.3	0.030	0.02	6.71	0.00		
20	9.87	0.00	32.512	0.000	25.05	291.8	0.059	0.06	6.70	0.00		
30	9.77	0.00	32.520	0.000	25.08	289.9	0.089	0.14	6.63	0.00		
50	9.49	0.01	32.502	0.017	25.11	287.2	0.147	0.37	6.70	0.00	1.57	
75	9.43	0.01	32.528	0.001	25.14	284.8	0.219	0.84	6.53	0.00	0.94	
100	8.71	0.01	32.708	0.002	25.39	260.9	0.287	1.45	6.13	0.01	0.94	
150	7.59	0.00	33.569	0.000	26.23	181.9	0.399	2.83	3.90	0.00		
200	7.14	0.01	33.884	0.003	26.54	153.1	0.483	4.33	3.22	0.02	1.41	
250	6.45	0.02	33.950	0.008	26.69	139.7	0.557	6.03	2.77	0.05	1.78	
300	5.87	0.02	33.983	0.002	26.79	130.5	0.625	7.95	2.23	0.00	0.97	
400	5.16	0.06	34.040	0.007	26.92	119.0	0.751	12.45	1.43	0.01	0.74	
500	4.74	0.01	34.089	0.002	27.00	111.4	0.868	17.81	0.85	0.01	0.88	
600	4.37	0.02	34.159	0.005	27.10	102.8	0.916	23.90	0.51	0.03	0.67	
700	4.07	0.00	34.229	0.001	27.19	95.1	1.006	30.57	0.33	0.01	0.92	
800	3.81	0.01	34.282	0.001	27.26	89.1	1.109	37.73	0.27	0.02	0.65	
1000	3.35	0.00	34.365	0.000	27.37	79.3	1.339	53.41	0.31	0.00	0.95	
1200	2.93	0.01	34.434	0.001	27.46	70.7	1.491	70.52	0.42	0.00	0.89	
1500	2.41	0.00	34.513	0.000	27.57	60.5	1.691	98.06	0.73	0.00	10.68	

BROWN BEAR CRUISE 322 STATION 075 OBSERVED VALUES

DATE 27/04/63 HR 22.5 LAT 46-14 N LONG 127-45 W SNG 2800 WEA 02 WIND VEL 16 DIR 17
 BAROM 23.0 TEMP DRY 12.5 WET 11.1 RELHU 82 WTRCLR SEA 3 DIR 17 SWELL 2 DIR 19
 CLOUD TYPE 7 AMT 9 VIS 6 WIRE ANGLE(S) 8

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	ADU	SATN	PHOS	NITR	SIL
1	0	10.12	32.531	25.03	6.48	0.579	-0.024	104	0.65	1.5	4	
1	5	10.10	32.532	25.03	6.88	0.614	-0.059	111	0.74	1.2	4	
1	10	10.09	32.533	25.03	6.94	0.620	-0.065	112	0.82	1.2	4	
1	20	10.07	32.532	25.04	7.30	0.652	-0.097	117	0.85	1.4	4	
1	30	9.76	32.555	25.11	6.68	0.597	-0.038	107	0.85	2.1	4	
1	50	10.01*	32.549	25.06	6.69	0.598	-0.022	104	0.93	2.1	5	
1	75	8.11	32.550	25.93	6.47	0.578	-0.022	104	0.85	2.2	4	
1	100		33.278	26.18	4.75	0.424	0.154	73	0.99	19.6	24	
1	125	7.79	33.545	26.41	4.48	0.400	0.181	69	1.88	18.3	24	
1	150	7.57	33.789	26.58	3.71	0.331	0.252	57	2.02	22.9	31	
1	175		33.885		3.86	0.345		51	2.17	27.3	39	
1	200	6.94	33.901		3.37	0.301	0.291		2.08	22.0	33	
1	295	5.82	33.978	26.79	2.25	0.201	0.407	33	2.59	34.6	60	

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BROWN BEAR CRUISE 322 STATION 075 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.12	0.00	32.531	0.000	25.03	294.0	0.000	0.00	6.48	0.00	
10	10.09	0.00	32.533	0.000	25.03	293.6	0.030	0.02	6.94	0.00	
20	10.07	0.00	32.532	0.000	25.04	293.5	0.060	0.06	7.30	0.00	
30	9.76	0.00	32.555	0.000	25.11	287.1	0.089	0.14	6.68	0.00	
50	9.19	0.01	32.549	0.000	25.19	279.1	0.146	0.37	6.69	0.00	2.50
75	8.58	0.01	32.550	0.000	25.29	270.5	0.215	0.81	6.47	0.00	2.45
100	8.11	0.00	33.278	0.000	25.93	210.0	0.276	1.35	4.75	0.00	
150	7.57	0.00	33.789	0.000	26.41	165.3	0.370	2.53	3.71	0.00	
200	6.94	0.00	33.901	0.000	26.58	149.2	0.450	3.95	3.37	0.00	
250	6.26	0.02	33.862	0.025	26.64	143.9	0.523	5.65	1.96	0.22	57.84

BROWN BEAR CRUISE 322 STATION 076 OBSERVED VALUES
 DATE 28/04/63 HR 00.3 LAT 46-16 N LONG 127-27 W SNG 2785 WEA 02 WIND VEL 14 DIR 13
 BAROM 23.0 TEMP DRY ° WEI ° RELHU WTRCLR SEA 2 DIR 17 SWELL 1 DIR 13
 CLOUD TYPE 8 AMT 8 VIS 6 WIRE ANGLE(S) 26, ---
 CST DEPTH TEMP SAL SIGMA-T ML/L MGA/L OXYGEN AOU SATN
 2 0 10.13 32.539 25.03 6.69 0.598 -0.043 108
 2 5 10.15 32.539 25.03 6.72 0.600 -0.046 108
 2 10 10.17 32.533 25.02 6.72 0.600 -0.046 108
 2 19 10.16 32.536 25.03 6.75 0.603 -0.049 109
 2 29 10.08 32.545 25.05 6.76 0.604 -0.049 109
 2 48 9.85 32.554 25.09 6.56 0.586 -0.028 105
 2 73 9.51 33.000 25.49 5.33 0.476 0.085 85
 2 97 9.25 33.600 26.00 3.85 0.344 0.218 61
 2 122 8.53 33.679 26.18 3.33 0.297 0.273 52
 2 146 8.05 33.790 26.34 3.01 0.269 0.308 47
 2 170 7.77 33.914 26.48 2.69 0.240 0.340 41
 1 180 7.65 33.903 26.49 2.70 0.241 0.340 41
 1 268 6.57 33.985 26.70 2.27 0.203 0.394 34
 1 448 5.26 34.086 26.94 1.12 0.100 0.515 16
 1 673 4.25 34.221 27.16 1.04 0.093 0.538 15
 1 898 3.78 34.365 27.33 0.24 0.021 0.616 3
 1 1354 2.76 34.498 27.53 0.54 0.048 0.606 7
 1 1628 2.30 34.558 27.62 0.95 0.085 0.577 13

BROWN BEAR CRUISE 322 STATION 076 BIOLOGICAL DATA			
DEPTH	CHL-A	PRODUCTIVITY LAB-I DECK-I	SAL
0	0.54	0.68	32.502
8	0.55	0.49	32.521
24	0.59	0.78	32.524
40	0.48	0.49	32.524
100	0.05	0.06	33.463
22.07		25.15	- WATER COLUMN VALUES
MESSENGER TIME 1707		INCOMING SOLAR RADIATION - AM 118 PM	

DEPTH	BROWN BEAR		CRUISE 322		STATION 076		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	10.13	0.00	32.539	0.000	25.03	293.6	0.000	0.00	6.69	0.00		
10	10.17	0.00	32.533	0.000	25.02	294.9	0.030	0.02	6.72	0.00		
20	10.15	0.00	32.537	0.000	25.03	294.5	0.060	0.06	6.75	0.00	0.88	
30	10.07	0.00	32.545	0.001	25.05	292.7	0.089	0.14	6.75	0.00	0.99	
50	9.82	0.00	32.572	0.009	25.11	287.1	0.148	0.38	6.50	0.02	1.07	
75	9.41	0.05	32.605	0.096	25.36	264.0	0.217	0.82	5.77	0.21	1.97	
100	9.16	0.01	33.609	0.001	26.02	201.1	0.230	1.13	3.78	0.00	0.78	
150	8.14	0.03	33.631	0.063	26.20	185.0	0.387	2.72	3.43	0.13	1.26	
200	7.37	0.01	33.978	0.036	26.58	149.3	0.472	4.21	2.46	0.10	0.69	
250	6.76	0.00	34.005	0.023	26.69	139.8	0.545	5.89	2.27	0.07	0.71	
300	6.28	0.02	34.006	0.002	26.75	134.0	0.614	7.84	2.04	0.03	0.93	
400	5.53	0.02	34.063	0.003	26.89	121.6	0.743	12.45	1.40	0.04	0.75	
500	4.97	0.00	34.116	0.000	27.00	112.1	0.861	17.88	1.07	0.07	0.78	
600	4.51	0.01	34.176	0.000	27.10	103.2	0.959	24.00	1.02	0.08	0.70	
700	4.18	0.01	34.239	0.001	27.18	95.6	1.070	30.70	0.95	0.02	0.85	
800	3.95	0.02	34.305	0.002	27.26	89.0	1.163	37.88	0.59	0.06	0.59	
1000	3.54	0.01	34.406	0.005	27.38	66.4	1.332	53.45	0.17	0.06	0.92	
1200	3.05	0.00	34.467	0.006	27.47	50.1	1.453	70.40	0.27	0.08	0.88	
1500	2.49	0.00	34.527	0.002	27.51	40.5	1.581	97.79	0.80	0.02	6.65	

BROWN BEAR CRUISE 322 STATION 077 OBSERVED VALUES

DATE 28/04/63 HR 04.7 LAT 46-14 N LONG 128-00 W WEA 50 WIND VEL 17 DIR 18
BAROM 22.0 TEMP DRY 12.2 WET 11.1 RELHU 88 WTRCLR SECDI 2789 SEA 1 DIR 18 SWELL 1 DIR 14
CLOUD TYPE 8 AMT 9 VIS 5 WIRE ANGLE(S) --

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN
					ML/L	MGA/L		
1	0	10.01	32.547	25.06	7.08	0.632	-0.076	114
1	5	10.05	32.538	25.05	6.72	0.600	-0.045	108
1	10	10.06	32.529	25.04	6.85	0.612	-0.056	110
1	19	10.06	32.529	25.04	6.72	0.600	-0.045	108
1	29	9.92	32.531	25.06	6.76	0.604	-0.046	108
1	48	9.59	32.553	25.13	6.57	0.587	-0.025	105
1	73	9.58	32.553	25.13	6.53	0.583	-0.022	104
1	97	8.34	32.939	25.63	5.51	0.492	0.084	85
1	122	8.05	33.500	26.11	4.27	0.381	0.196	66
1	146	7.84	33.730	26.32	3.53	0.315	0.264	54
1	171	7.49	33.865	26.48	3.39	0.303	0.281	52
1	195	7.06	33.914	26.58	3.19	0.285	0.305	48
1	290	5.71	33.954	26.78	2.44	0.218	0.391	36

BROWN BEAR CRUISE 322 STATION 077 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY	LAB-I	DECK-I	SAL
0	0.39				32.526
8	0.31				32.519
24	0.34				32.525
40	0.29				32.532
100	0.04				33.187

12.96 - WATER COLUMN VALUES

MESSANGER TIME 2109 INCOMING SOLAR RADIATION - AM 118 PM

DEPTH	BROWN BEAR		CRUISE 322		STATION 077		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	10.01	0.00	32.547	0.000	25.06	291.1	0.000	0.00	7.08	0.00		
10	10.06	0.00	32.529	0.000	25.04	293.4	0.030	0.02	6.85	0.00		
20	10.05	0.00	32.529	0.000	25.04	293.4	0.059	0.06	6.72	0.00	0.88	
30	9.90	0.00	32.532	0.000	25.07	291.0	0.089	0.14	6.75	0.00	0.97	
50	9.50	0.02	32.546	0.005	25.12	285.7	0.147	0.37	6.58	0.02	0.91	
75	9.48	0.03	32.575	0.003	25.17	282.1	0.219	0.83	6.47	0.01	0.88	
100	8.28	0.02	33.011	0.009	25.69	232.3	0.283	1.41	5.35	0.01	0.85	
150	7.79	0.00	33.758	0.000	26.35	170.7	0.385	2.67	3.49	0.02	0.81	
200	6.96	0.00	33.917	0.002	26.59	148.3	0.465	4.10	3.14	0.00	8.41	
250	6.08	0.04	33.997	0.020	26.77	131.5	0.536	5.72	2.68	0.02	59.62	

BROWN BEAR CRUISE 322 STATION 078 OBSERVED VALUES

DATE 28/04/63 HR 09.5 LAT 46-20 N LONG 127-18 W WIND VEL 19 DIR 14
 BAROM 19.0 TEMP DRY 12.2 WET 11.2 RELHU 88 WTRCLR SEA DIR 14 SWELL DIR 19
 CLOUD TYPE VIS WIRE ANGLE(S) 22.10

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN
2	0	10.18	32.553	25.03	6.97	0.623	-0.069	112
2	5	10.20	32.581	25.05	6.85	0.612	-0.058	111
2	10	10.21	32.557	25.03	6.85	0.612	-0.058	111
2	19	10.23	32.550	25.02	6.80	0.607	-0.054	110
2	29	9.90	32.538	25.07	6.68	0.597	-0.039	107
2	48	9.63	32.550	25.12	6.59	0.589	-0.028	105
2	72	9.73	32.941	25.41	5.80	0.518	0.040	93
2	97	8.38	33.549	26.10	3.70	0.330	0.243	58
2	120	8.13	33.761	26.30	3.21	0.287	0.289	50
2	146	7.87	33.863	26.42	2.87	0.256	0.322	44
2	168	7.54	33.926	26.52	2.52	0.225	0.358	39
1	182	7.42	33.928	26.54				
1	272	6.44	33.998	26.73	2.12	0.189	0.409	32
1	455	5.25	34.171	27.01	1.04	0.093	0.523	7
1	684	4.44	34.240	27.16	0.39	0.035	0.593	6
1	915	3.79	34.370	27.33	0.45	0.040	0.597	6
1	1380	2.76	34.505	27.53	0.69	0.062	0.592	9
1	1659	2.40	34.540	27.59	0.82	0.073	0.587	11

BROWN BEAR CRUISE 322 STATION 078 BIOLOGICAL DATA

ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0235-0245 DEPTHS 100, 70
 35, 0

BROWN BEAR		CRUISE 322		STATION 078		INTERPOLATED AND COMPUTED VALUES					VAR RATIO
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	XY ML/L	E(O)	
0	10.18	0.00	32.553	0.000	25.03	293.3	0.000	0.00	6.97	0.00	
10	10.21	0.00	32.557	0.000	25.03	293.7	0.030	0.02	6.85	0.00	
20	10.20	0.01	32.549	0.000	25.03	294.4	0.060	0.05	6.79	0.00	0.88
30	9.88	0.00	32.535	0.002	25.07	290.4	0.089	0.14	6.68	0.01	0.97
50	9.55	0.02	32.571	0.003	25.14	284.6	0.147	0.37	6.56	0.01	0.91
75	9.58	0.05	33.019	0.011	25.50	250.7	0.215	0.80	5.54	0.05	0.85
100	8.32	0.02	33.589	0.004	26.14	189.9	0.270	1.29	3.59	0.02	0.83
150	7.81	0.01	33.878	0.001	26.44	162.0	0.359	2.41	2.81	0.00	0.78
200	7.23	0.02	33.936	0.002	26.57	150.3	0.437	3.82	2.29	0.08	1.89
250	6.68	0.02	33.976	0.003	26.68	140.9	0.511	5.51	2.12	0.06	1.44
300	6.21	0.01	34.021	0.003	26.78	131.6	0.580	7.45	1.95	0.02	0.94
400	5.53	0.02	34.122	0.005	26.94	117.2	0.705	11.92	1.36	0.03	0.75
500	5.05	0.02	34.189	0.006	27.05	107.7	0.819	17.15	0.85	0.06	0.80
600	4.68	0.02	34.221	0.009	27.12	101.9	0.924	23.12	0.54	0.00	0.68
700	4.39	0.00	34.249	0.001	27.17	97.3	1.025	29.84	0.38	0.01	0.91
800	4.10	0.00	34.304	0.004	27.24	90.7	1.120	37.16	0.37	0.03	0.60
1000	3.57	0.00	34.405	0.002	27.38	78.8	1.292	52.92	0.49	0.00	0.93
1200	3.10	0.01	34.468	0.003	27.47	70.1	1.443	69.91	0.59	0.01	0.88
1500	2.58	0.00	34.522	0.001	27.56	61.8	1.643	97.64	0.75	0.00	0.62

BROWN BEAR				CRUISE 322	STATION 079	OBSERVED VALUES								
DATE	28/04/63	HR	13.1	LAT	46-14 N	LONG	127-02 W	WEA	03	WIND	VEL	17	DIR	18
BAROM	21.0	TEMP	DRY 10.8	WET	10.0	RELHU	94	SEA	2	DIR	18	SWELL	1	DIR
CLOUD	TYPE 6	AMT	3	VIS	7	WIRE	ANGLE(S) 8	SCDI						
								SNRG	2651					

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	-	-
1	0	10.05	32.524	25.03	6.70	0.598	-0.043			
1	5	10.07	32.520	25.03	6.59	0.589	-0.033			108
1	10	10.12	32.522	25.02	6.76	0.604	-0.049			106
1	19	10.11	32.524	25.02	6.78	0.606	-0.051			109
1	29	10.05	32.525	25.03	6.76	0.604	-0.055			109
1	48	9.64	32.543	25.12	6.48	0.579	-0.018			103
1	73	9.24	33.050	25.58	5.13	0.458	0.119			79
1	97	8.29	33.590	26.15	3.39	0.303	0.271			53
1	121	8.09	33.821	26.36	2.89	0.258	0.318			45
1	145	7.77	33.886	26.45	2.78	0.248	0.332			43
1	168	7.56	33.934	26.52	2.58	0.230	0.352			40
1	193	7.23	33.954	26.58	2.52	0.225	0.362			38
1	288	6.35	34.020	26.76	1.93	0.172	0.427			29

BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.65	1.11	9.16	32.482
8	0.68	1.14		32.490
24	0.71	0.94		32.517
40	0.65	0.45		32.538
100		0.02		33.582
27.35		36.76	-	WATER COLUMN VALUES

MESSENGER TIME 0523

DEPTH	BROWN BEAR	CRUISE 322			STATION 079			INTERPOLATED AND COMPUTED VALUES				
		TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0		10.05	0.00	32.524	0.000	25.03	293.4	0.000	0.00	6.70	0.00	
10		10.12	0.00	32.522	0.000	25.02	294.9	0.030	0.02	6.76	0.00	
20		10.11	0.00	32.524	0.000	25.02	294.7	0.060	0.06	6.78	0.00	0.88
30		10.03	0.00	32.522	0.002	25.04	293.9	0.089	0.14	6.76	0.00	0.97
50		9.62	0.01	32.572	0.006	25.14	283.9	0.148	0.38	6.40	0.01	0.91
75		9.16	0.02	33.100	0.005	25.63	238.2	0.213	0.79	4.97	0.02	0.88
100		8.25	0.02	33.632	0.003	26.18	185.7	0.267	1.26	3.28	0.02	0.84
150		7.72	0.01	33.998	0.000	26.47	159.3	0.354	2.36	2.73	0.01	0.75
200		7.13	0.01	33.956	0.001	26.60	147.6	0.431	3.74	2.52	0.01	1.71
250		6.48	0.05	33.963	0.011	26.69	139.2	0.503	5.41	2.44	0.07	65.46

BROWN BEAR CRUISE 322 STATION 080 OBSERVED VALUES
 DATE 28/04/63 HR 15.4 LAT 46-14 N LONG 126-49 W WEA 02 WIND VEL 14 DIR 16
 BAROM 22.0 TEMP DRY 11.1 WET 10.2 RELHU 87 WTRCLR SEA 1 DIR 16 SWELL 1 DIR 16
 CLOUD TYPE 6 AMT 4 VIS 7 WIRE ANGLE(S) 15,--
 CST DEPTH TEMP SAL SIGMA-T ML/L MGA/L OXYGEN -- -- -- SATN
 2 0 11.19 32.533 24.84 6.54 0.584 -0.042 108
 2 5 10.08 32.534 25.04 6.59 0.589 -0.033 106
 2 10 10.11 32.538 25.04 6.74 0.602 -0.047 108
 2 20 10.09 32.536 25.04 6.62 0.591 -0.036 107
 2 29 10.04 32.535 25.04 6.64 0.593 -0.037 107
 2 49 9.51 32.535 25.13 6.46 0.577 -0.014 103
 2 73 9.33 33.003 25.53 5.23 0.467 0.096 83
 2 98 8.78 33.506 26.00 4.00 0.357 0.211 63
 2 123 8.45 33.740 26.24 3.28 0.293 0.279 51
 2 148 7.99 33.800 26.35 3.05 0.272 0.305 47
 2 172 7.80 33.890 26.45 2.86 0.255 0.324 44
 1 188 7.44 33.911 26.52 3.05 0.272 0.312 47
 1 281 6.42 34.014 26.74 2.20 0.196 0.402 33
 1 471 5.23 34.115 26.97 1.04 0.093 0.523 15
 1 711 4.38 34.260 27.18 0.76 0.068 0.561 11
 1 954 3.67 34.388 27.36 0.28 0.025 0.614 4
 1 1444 2.63 34.529 27.56 0.66 0.059 0.597 9
 1 1739 2.17 34.570 27.64 1.08 0.096 0.567 15

DEPTH	BROWN BEAR		CRUISE 322		STATION 080		INTERPOLATED AND COMPUTED VALUES				
	TEMP	E (T)	SAL	E (S)	SIGMA-T	SP VOL ANOMALY	GEO POT ANOMALY	POT ENERGY	OXY ML/L	E (O)	VAR RATIO
0	11.19	0.00	32.533	0.000	24.84	311.5	0.000	0.00	6.54	0.00	
10	10.11	0.00	32.538	0.000	25.04	293.5	0.031	0.02	6.74	0.00	
20	10.09	0.00	32.536	0.000	25.04	293.5	0.061	0.06	6.62	0.00	
30	10.02	0.01	32.531	0.003	25.05	292.9	0.090	0.14	6.64	0.00	0.99
50	9.50	0.01	32.549	0.003	25.14	283.9	0.149	0.37	6.42	0.01	0.95
75	9.29	0.01	33.048	0.003	25.57	244.5	0.215	0.80	5.12	0.01	0.89
100	8.75	0.00	33.533	0.001	26.03	200.5	0.271	1.29	3.92	0.00	0.89
150	7.98	0.01	33.808	0.001	26.36	169.6	0.364	2.47	3.02	0.01	0.88
200	7.25	0.03	33.926	0.000	26.56	151.5	0.445	3.91	3.03	0.07	1.48
250	6.64	0.06	33.983	0.000	26.69	139.8	0.518	5.60	2.66	0.13	1.58
300	6.26	0.01	34.027	0.002	26.77	132.3	0.587	7.54	2.05	0.00	0.96
400	5.58	0.03	34.085	0.006	26.90	120.6	0.714	12.10	1.38	0.00	0.75
500	5.10	0.01	34.132	0.001	27.00	112.4	0.832	17.52	0.98	0.03	0.87
600	4.72	0.02	34.193	0.002	27.09	104.4	0.942	23.69	0.82	0.06	0.67
700	4.41	0.00	34.253	0.000	27.17	97.2	1.044	30.48	0.76	0.01	0.93
800	4.10	0.00	34.310	0.001	27.25	90.3	1.138	37.78	0.57	0.02	0.65
1000	3.55	0.00	34.407	0.001	27.38	78.5	1.309	53.48	0.27	0.02	0.96
1200	3.09	0.01	34.474	0.003	27.48	69.6	1.459	70.37	0.33	0.06	0.89
1500	2.54	0.00	34.538	0.000	27.58	60.2	1.656	97.60	0.75	0.01	11.26

BROWN BEAR CRUISE 322 STATION 081 OBSERVED VALUES
 DATE 28/04/63 HR 18.3 LAT 46-14 N LONG 126-35 W SNOG 2651 WEA 02 WIND VEL 14 DIR 16
 BAROM 20.0 TEMP DRY 7 WET 7 RELHU WTRCLR SECDI 11 SEA 1 DIR 16 SWELL 1 DIR 13
 CLOUD TYPE 8 AMT 5 VIS 7 WIRE ANGLE(S) 10

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
1	0	10.03	32.474	25.00	6.83	0.610	-0.054		110
1	5	10.05	32.480	25.00	6.76	0.604	-0.048		109
1	10	10.05	32.477	25.00	6.94	0.620	-0.064		112
1	19	10.00	32.493	25.02	6.83	0.610	-0.054		110
1	29	9.58	32.471	25.07	7.12	0.636	-0.074		113
1	48	9.53	32.478	25.08	7.52	0.672	-0.109		119
1	72	9.58	32.480	25.08	7.59	0.678	-0.120		122
1	96	8.54	32.823	25.51	5.71	0.510	0.064		89
1	120	8.56	33.518	26.05	3.94	0.352	0.219		62
1	144	7.97	33.801	26.36	4.00	0.357	0.220		62
1	168	7.67	33.922	26.50	2.97	0.265	0.317		46
1	192	7.30	33.936	26.56	2.61	0.233	0.353		40
1	286	6.01	33.966	26.76	2.32	0.207	0.398		34

BROWN BEAR CRUISE 322 STATION 081 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	CRUISE 322 DECK-I	LIGHT PROD	SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	1.00	0.72	9.62			50	32.475	0.77	1.5	4
5	1.10	1.17	7.56			10	32.469	0.76	1.4	3
20	1.12	0.80	1.84				32.468	0.74	1.2	4
37	1.05	0.79	0.34	0.81	100	1	32.467	0.74	1.3	4
				0.73	66					
				0.55	49					
				0.49	35					
				0.26	16					
				0.04	5					

40.31 33.10 131.98 - WATER COLUMN VALUES

MESSENGER TIME 1113

LIGHT SATURATION INCUBATOR ILLUMINATION 18800

BROWN BEAR CRUISE 322 STATION 081 INTERPOLATED AND COMPUTED VALUES											
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.03	0.00	32.474	0.000	25.00	296.8	0.000	0.00	6.83	0.00	
10	10.05	0.00	32.477	0.000	25.00	297.1	0.030	0.02	6.94	0.00	
20	9.96	0.01	32.491	0.001	25.02	294.8	0.060	0.06	6.85	0.01	0.88
30	9.56	0.01	32.471	0.001	25.07	290.3	0.090	0.14	7.15	0.00	0.97
50	9.55	0.02	32.472	0.004	25.08	290.4	0.148	0.38	7.57	0.02	0.91
75	9.45	0.04	32.504	0.000	25.12	286.9	0.221	0.84	7.41	0.04	0.84
100	8.53	0.04	32.941	0.018	25.60	241.1	0.287	1.43	5.35	0.04	0.80
150	7.88	0.01	33.844	0.002	26.40	165.6	0.390	2.70	3.76	0.05	0.73
200	7.17	0.00	33.982	0.026	26.62	146.2	0.468	4.10	2.59	0.02	11.83
250	6.38	0.03	34.004	0.030	26.74	134.9	0.539	5.73	1.98	0.16	60.14

BROWN BEAR CRUISE 322 STATION 082 OBSERVED VALUES									
DATE 28/04/63	HR 22.0	LAT 46-14 N	LONG 126-19 W	SNDG 2651	WEA 00	WIND VEL 13 DIR 15			
BAROM 22.0	TEMP DRY 12.5	WET 10.7	RELHU 76	WTRCLR	SECDI 11	SEA 3 DIR 21	SWELL 2 DIR 21		
CLOUD TYPE 7	AMT 0	VIS	WIRE ANGLE(S)	7.5, 11					
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
2	0	10.47	32.473	24.92	6.94	0.620	-0.069	113	
2	5	10.36	32.469	24.94	6.90	0.616	-0.064	112	
2	10	10.28	32.473	24.96	7.03	0.628	-0.075	114	
2	20	10.03	32.474	25.00	6.89	0.615	-0.059	111	
2	30	9.52	32.493	25.10	6.83	0.610	-0.047	108	
2	50	9.48	32.506	25.11	6.62	0.591	-0.028	105	
2	75	9.42	32.544	25.15	6.44	0.575	-0.012	102	
2	100	8.42	33.241	25.85	4.48	0.400	0.174	70	
2	125	7.36	33.499	26.21	4.51	0.403	0.185	69	
2	149	7.35	33.753	26.41	3.44	0.307	0.279	52	
2	172	7.22	33.887	26.53	3.23	0.288	0.299	49	
3	196	7.00	33.911	26.58	3.18	0.284	0.307	48	
3	292	5.95	33.966	26.76	2.25	0.201	0.405	33	
3	487	4.84	34.102	27.00	0.95	0.085	0.537	14	
3	733	4.10	34.269	27.22	0.34	0.030	0.603	5	
3	977	3.49	34.426	27.40	0.49	0.044	0.598	7	
1	1480	2.56	34.527	27.57	0.75	0.067	0.590	10	
1	1974	1.96	34.603	27.68	1.48	0.132	0.535	20	
1	2467	1.73	34.648	27.73	1.84	0.164	0.507	24	
1	2566	1.74	34.643	27.73	1.90	0.170	0.501	25	

BROWN BEAR CRUISE 322 STATION 082			BIOLOGICAL DATA
DEPTH	CHL-A	PRODUCTIVITY LAB-I	SAL
0	1.24	1.47	32.457
5	1.22	1.44	32.462
20	1.56	1.40	32.455
37	0.60	0.28	32.484
100	0.06	0.00	33.254
45.25		42.79	- WATER COLUMN VALUES
MESSENGER TIME 1450			

BROWN BEAR			CRUISE 322			STATION 082			INTERPOLATED AND COMPUTED VALUES					
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VCL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO			
0	10.47	0.00	32.473	0.000	24.92	303.9	0.000	0.00	6.94	0.00				
10	10.28	0.00	32.473	0.000	24.96	301.1	0.031	0.02	7.03	0.00				
20	10.03	0.00	32.474	0.000	25.00	297.2	0.061	0.06	6.89	0.00				
30	9.52	0.00	32.493	0.000	25.10	288.0	0.091	0.14	6.83	0.00				
50	9.48	0.00	32.506	0.000	25.11	286.8	0.148	0.38	6.62	0.00				
75	9.42	0.00	32.544	0.000	25.15	283.4	0.220	0.84	6.44	0.00				
100	8.42	0.00	33.241	0.000	25.85	217.2	0.283	1.39	4.48	0.00				
150	7.35	0.00	33.761	0.000	26.42	164.3	0.379	2.59	3.42	0.00	0.94			
200	6.96	0.00	33.914	0.000	26.59	148.4	0.458	4.00	3.15	0.01	1.07			
250	6.41	0.02	33.945	0.003	26.69	139.5	0.531	5.67	2.72	0.06	1.22			
300	5.89	0.01	33.971	0.000	26.78	131.7	0.599	7.60	2.18	0.00	0.98			
400	5.22	0.04	34.040	0.001	26.91	119.7	0.726	12.13	1.44	0.00	0.77			
500	4.79	0.01	34.111	0.000	27.02	110.3	0.842	17.47	0.89	0.00	0.94			
600	4.45	0.03	34.180	0.000	27.11	102.2	0.949	23.52	0.55	0.02	0.68			
700	4.17	0.01	34.247	0.000	27.19	94.9	1.049	30.16	0.37	0.01	0.83			
800	3.92	0.00	34.316	0.002	27.27	87.8	1.141	37.27	0.34	0.03	0.70			
1000	3.44	0.00	34.434	0.002	27.41	75.1	1.306	52.41	0.50	0.00	0.98			
1200	3.03	0.00	34.491	0.011	27.50	67.6	1.451	68.70	0.58	0.02	0.83			
1500	2.53	0.00	34.531	0.000	27.57	60.7	1.646	95.69	0.78	0.01	0.94			
2000	1.94	0.00	34.607	0.001	27.68	50.3	1.928	145.92	1.50	0.00	0.94			
2500	1.73	0.00	34.647	0.000	27.73	46.7	2.175	203.11	1.86	0.00	2.22			

BROWN BEAR CRUISE 322 STATION 083 OBSERVED VALUES

DATE 29/04/63 HR 00.5 LAT 46-16 N LONG 126-05 W SNRG 2560 WEA 02 WIND VEL 10 DIR 14
 BAROM 17.0 TEMP DRY 11.3 WEI 10.6 RELHU 94 WTRCLR SEA 1 DIR 14 SWELL 1 DIR 21
 CLOUD TYPE 1 AMT 3 VIS 7 WIRE ANGLE(S) 8

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN
					MGA/L			
1	0	10.64	32.519	24.93	6.76	0.604	-0.055	110
1	5	10.48	32.510	24.95	6.74	0.602	-0.052	109
1	10	10.03	32.491	25.01	6.75	0.603	-0.047	108
1	20	9.50	32.434	25.05	6.70	0.598	-0.035	106
1	29	9.42	32.454	25.08	6.71	0.599	-0.035	106
1	49	9.43	32.477	25.10	5.99	0.535	0.029	95
1	73	9.18	32.550	25.20	6.22	0.556	0.011	98
1	98	8.22	33.100	25.77	4.91	0.439	0.139	76
1	122	7.59	33.393	26.09	4.46	0.398	0.186	68
1	147	7.71	33.783	26.38	3.36	0.300	0.281	52
1	171	7.65	33.893	26.48	2.79	0.249	0.332	43
1	196	7.13	33.902	26.56				
1	291	5.96	33.975	26.77	2.05	0.183	0.422	30

BROWN BEAR CRUISE 322 STATION 083				INTERPOLATED AND COMPUTED VALUES							
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.64	0.00	32.519	0.000	24.93	303.3	0.000	0.00	6.76	0.00	
10	10.03	0.00	32.491	0.000	25.01	295.7	0.031	0.02	6.75	0.00	
20	9.50	0.00	32.434	0.000	25.05	291.9	0.060	0.06	6.70	0.00	
30	9.42	0.00	32.455	0.001	25.08	289.3	0.090	0.14	6.68	0.01	0.99
50	9.43	0.00	32.475	0.000	25.10	288.3	0.148	0.38	6.00	0.02	0.95
75	9.11	0.01	32.550	0.000	25.24	275.4	0.219	0.83	6.13	0.03	0.89
100	8.15	0.01	33.122	0.000	25.80	221.8	0.281	1.38	4.87	0.02	0.88
150	7.72	0.00	33.802	0.000	26.40	166.1	0.379	2.60	3.27	0.01	0.86
200	7.02	0.01	33.944	0.021	26.61	147.1	0.458	4.01	2.53	0.08	49.84
250	6.55	0.16	33.985	0.033	26.70	138.5	0.530	5.67	2.48	0.19	99.99

BROWN BEAR CRUISE 322 STATION 084 OBSERVED VALUES
 DATE 29/04/63 HR 02.2 LAT 46-15 N LONG 125-50 W SNG 2597 WEA 02 WIND VEL 10 DIR 14
 BAROM 17.0 TEMP DRY 11.2 WET 10.0 RELHU 87 WTRCLR SEA 2 DIR 14 SWELL 1 DIR 21
 CLOUD TYPE 0 AMT 7 VIS 8 WIRE ANGLE(S) 6, 6
 CST DEPTH TEMP SAL SIGMA-T ML/L MGA/L OXYGEN/L AOU SATN
 2 0 10.34 32.137 24.68 6.71 0.599 -0.046 108
 2 5 10.33 32.162 24.71 6.74 0.602 -0.048 109
 2 10 10.19 32.144 24.72 6.76 0.604 -0.048 109
 2 20 10.00 32.197 24.79 6.79 0.606 -0.049 109
 2 30 9.97 32.460 25.00 6.99 0.624 -0.067 112
 2 49 9.47 32.536 25.14 6.12 0.547 0.016 97
 2 74 8.54 33.112 25.73 4.69 0.419 0.154 73
 2 99 8.07 33.507 26.11 3.72 0.332 0.245 58
 2 124 7.86 33.759 26.34 3.14 0.280 0.299 48
 2 149 7.51 33.922 26.52 2.62 0.234 0.349 40
 2 174 7.29 33.944 26.57 2.37 0.212 0.375 36
 1 198 7.18 33.957 26.59 2.42 0.216 0.372 37
 1 295 6.27 33.997 26.75 1.97 0.176 0.425 29
 1 492 5.03 34.112 26.99 0.84 0.075 0.544 12
 1 736 4.22 34.278 27.21 0.29 0.026 0.605 4
 1 982 3.46 34.413 27.40 0.34 0.030 0.612 5
 1 1474 2.45 34.537 27.59 0.83 0.074 0.585 11
 1 1770 2.12 34.589 27.65 1.37 0.122 0.542 18

BROWN BEAR CRUISE 322 STATION 084 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	SAL
0	0.67	0.55	32.099
5	0.67	0.73	
20	1.49	1.04	32.346
37	0.89	0.45	32.164

39.89 29.23 - WATER COLUMN VALUES

MESSENGER TIME 1850

BROWN BEAR			CRUISE 322			STATION 084		INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	10.34	0.00	32.137	0.000	24.68	326.7	0.000	0.00	6.71	0.00		
10	10.19	0.00	32.144	0.000	24.72	324.0	0.033	0.02	6.76	0.00		
20	10.00	0.00	32.197	0.000	24.79	317.2	0.066	0.07	6.79	0.00		
30	9.97	0.00	32.460	0.000	25.00	297.4	0.097	0.15	6.99	0.00		
50	9.43	0.00	32.556	0.005	25.16	282.3	0.155	0.38	6.06	0.01	0.95	
75	8.51	0.00	33.131	0.000	25.75	226.4	0.219	0.79	4.64	0.00	0.94	
100	8.06	0.00	33.519	0.000	26.12	191.4	0.272	1.25	3.69	0.00	0.94	
150	7.50	0.00	33.924	0.001	26.52	154.3	0.359	2.35	2.60	0.00	0.94	
200	7.16	0.00	33.958	0.000	26.60	148.0	0.435	3.71	2.42	0.00	1.04	
250	6.73	0.04	33.979	0.001	26.67	141.2	0.508	5.39	2.25	0.04	1.27	
300	6.23	0.00	34.000	0.000	26.75	133.9	0.577	7.35	1.94	0.00	0.99	
400	5.53	0.01	34.054	0.001	26.89	122.3	0.706	11.97	1.35	0.04	0.77	
500	5.00	0.00	34.117	0.000	27.00	112.3	0.825	17.42	0.81	0.00	0.96	
600	4.62	0.03	34.186	0.002	27.10	103.7	0.934	23.57	0.50	0.01	0.68	
700	4.31	0.02	34.254	0.001	27.18	96.1	1.035	30.30	0.32	0.01	0.81	
800	4.01	0.00	34.317	0.001	27.26	88.8	1.128	37.49	0.27	0.02	0.72	
1000	3.41	0.00	34.420	0.001	27.41	75.9	1.295	52.78	0.35	0.00	0.98	
1200	2.93	0.00	34.483	0.006	27.50	57.1	1.440	69.09	0.49	0.00	0.89	
1500	2.41	0.00	34.541	0.000	27.59	58.6	1.631	95.48	0.87	0.00	12.31	

BROWN BEAR CRUISE 322 STATION 085 OBSERVED VALUES

DATE 29/04/63 HR 05.0 LAT 46-14 N LONG 125-35 W SNDG 2149 WEA 02 WIND VEL 16 DIR 18
 BAROM 16.0 TEMP DRY 11.7 WET 10.1 RELHU 81 WTRCLR SEA 1 DIR 18 SWELL 1 DIR 15
 CLOUD TYPE 0 AMT 7 VIS WIRE ANGLE(S) --

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	MG/L	AOU	SATN
1	0	10.42	32.178	24.70	6.99	0.624	-0.072	113	
1	5	10.47	32.174	24.69	7.34	0.656	-0.104	119	
1	10	10.13	32.191	24.76	6.81	0.608	-0.052	109	
1	20	10.02	32.282	24.85	6.44	0.575	-0.018	103	
1	30	9.69	32.377	24.98	6.72	0.600	-0.039	107	
1	49	9.59	32.379	25.00	6.68	0.597	-0.035	106	
1	74	8.92	32.825	25.45	5.34	0.477	0.088	84	
1	99	8.61	33.602	26.11	3.55	0.317	0.253	56	
1	124	8.22	33.835	26.35	3.07	0.274	0.300	48	
1	148	7.86	33.924	26.47	2.61	0.233	0.346	40	
1	173	7.51	33.953	26.54	2.53	0.226	0.357	39	
1	198	7.21	33.976	26.60	2.41	0.215	0.372	37	
1	296	6.10	34.025	26.79	1.68	0.150	0.453	25	

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BROWN BEAR CRUISE 322 STATION 085				INTERPOLATED AND COMPUTED VALUES							
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.42	0.00	32.178	0.000	24.70	325.0	0.000	0.00	6.99	0.00	
10	10.13	0.00	32.191	0.000	24.76	319.5	0.033	0.02	6.81	0.00	
20	10.02	0.00	32.282	0.000	24.85	311.2	0.065	0.07	6.44	0.00	
30	9.69	0.00	32.377	0.000	24.98	299.2	0.095	0.14	6.72	0.00	
50	9.57	0.01	32.389	0.001	25.01	296.8	0.156	0.39	6.64	0.01	0.95
75	8.90	0.00	32.858	0.006	25.48	252.4	0.225	0.83	5.26	0.01	0.94
100	8.60	0.00	33.618	0.003	26.12	191.9	0.281	1.32	3.52	0.01	0.94
150	7.83	0.00	33.928	0.001	26.48	158.7	0.369	2.43	2.60	0.01	0.89
200	7.19	0.00	33.978	0.000	26.61	146.8	0.446	3.81	2.40	0.00	6.32
250	6.65	0.01	34.008	0.001	26.71	138.1	0.518	5.46	2.06	0.00	63.09

BROWN BEAR CRUISE 322 STATION 086 OBSERVED VALUES
 DATE 29/04/63 HR 08.3 LAT 46-15 N LONG 125-21 W WIND VEL 24 DIR 18
 BAROM 16.0 TEMP DRY 11.7 WET 10.6 RELHU 87 WTRCIR SEA DIR 18 SWELL DIR 18
 CLOUD TYPE 7 AMT 0 VIS WIRE ANGLE(S) 45.00

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SECDI	WEA	SEA	DIR	SWELL	DIR
2	0	10.44	32.339	24.82	6.93	0.619	-0.067	112						
2	5	10.44	32.342	24.83	6.90	0.616	-0.065	112						
2	9	10.47	32.345	24.82	7.00	0.625	-0.074	113						
2	19	9.88	32.341	24.92	6.89	0.615	-0.057	110						
2	28	9.78	32.347	24.94	6.82	0.609	-0.049	109						
2	46	9.58	32.411	25.02	6.50	0.581	-0.018	103						
2	70	9.10	32.762	25.37	5.60	0.500	0.067	88						
2	93	8.21	33.442	26.04	4.08	0.364	0.212	63						
2	117	8.12	33.736	26.29	3.23	0.288	0.287	50						
2	140	7.62	33.871	26.46	2.89	0.258	0.324	44						
1	160	7.55	33.911	26.51										
2	162	7.45	33.920	26.53	2.79	0.249	0.335	43						
1	242	6.66	33.994	26.69										
1	412	5.39	34.072	26.92	1.09	0.097	0.517	16						
1	631	4.57	34.206	27.12	0.46	0.041	0.585	7						
1	857	3.96	34.324	27.27	0.23	0.021	0.614	3						
1	1314	2.91	34.491	27.51	0.55	0.049	0.602	8						
1	1590	2.40	34.540	27.59	0.95	0.085	0.575	13						

BROWN BEAR CRUISE 322 STATION 086				BIOLOGICAL DATA
DEPTH	CHL-A	PRODUCTIVITY LAB-I DECK-I	SAL	
0	0.73	0.76	32.348	
5	0.81	0.73	32.348	
20	1.32	0.99	32.356	
37	0.79	0.44	32.346	
37.81 29.00 - WATER COLUMN VALUES				
MESSENGER TIME 0003 INCOMING SOLAR RADIATION - AM 340 PM 224				
ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0045-0055 DEPTHS 100, 70				
				35, 0

DEPTH	BROWN BEAR		CRUISE 322		STATION 086		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	10.44	0.00	32.330	0.000	24.82	313.4	0.000	0.00	6.93	0.00		
10	10.42	0.02	32.345	0.000	24.83	312.8	0.032	0.02	7.00	0.01	1.00	
20	9.86	0.01	32.341	0.000	24.92	304.3	0.063	0.06	5.88	0.00	0.85	
30	9.75	0.00	32.348	0.002	24.94	302.4	0.094	0.14	6.80	0.00	0.95	
50	9.52	0.00	32.446	0.001	25.05	291.9	0.154	0.39	6.39	0.00	0.84	
75	8.89	0.03	32.912	0.021	25.5	248.2	0.222	0.82	5.27	0.04	0.75	
100	8.16	0.04	33.558	0.009	26.14	190.0	0.277	1.30	3.77	0.01	0.71	
150	7.54	0.00	33.897	0.002	26.50	156.9	0.364	2.40	2.83	0.01	0.59	
200	7.15	0.06	33.963	0.003	26.60	147.4	0.441	3.78	2.53	0.04	2.87	
250	6.59	0.00	33.999	0.001	26.71	138.0	0.513	5.43	2.19	0.08	5.11	
300	6.16	0.00	34.025	0.005	26.78	131.2	0.581	7.35	1.85	0.09	5.20	
400	5.46	0.00	34.068	0.001	26.90	120.5	0.708	11.69	1.17	0.02	1.06	
500	4.99	0.03	34.125	0.002	27.00	111.7	0.825	17.28	0.76	0.02	0.70	
600	4.65	0.01	34.186	0.001	27.09	104.1	0.934	23.43	0.51	0.01	0.82	
700	4.37	0.01	34.244	0.000	27.17	97.4	1.035	30.21	0.35	0.01	0.69	
800	4.10	0.01	34.296	0.000	27.24	91.3	1.131	37.56	0.26	0.01	0.66	
1000	3.60	0.00	34.387	0.000	27.36	80.5	1.305	53.55	0.25	0.02	0.91	
1200	3.15	0.00	34.459	0.000	27.46	71.3	1.458	70.87	0.40	0.02	0.88	
1500	2.56	0.00	34.529	0.000	27.57	61.1	1.660	98.66	0.82	0.01	7.06	

BROWN BEAR CRUISE 322 STATION 087 OBSERVED VALUES

DATE 29/04/63 HR 11.6 LAT 46-14 N LONG 125-07 W SNRG 1554 WEA DIR WIND VEL 0 DIR
 BAROM TEMP DRY 10.1 WET 8.9 RELHU 87 WTRCLR SEA DIR SWELL
 CLOUD TYPE VIS WIRE ANGLE(S) 25

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	ADU	SATN
1	0	10.35	32.271	24.79	6.65	0.594	-0.041	107	
1	4	10.37	32.262	24.78	6.85	0.612	-0.059	111	
1	8	10.36	32.276	24.79	6.89	0.615	-0.063	111	
1	16	10.22	32.285	24.82	6.82	0.609	-0.055	110	
1	23	9.76	32.297	24.91	6.70	0.598	-0.038	107	
1	39	9.63	32.322	24.95	6.70	0.598	-0.037	107	
1	59	9.29	32.562	25.19	6.09	0.544	0.021	96	
1	80	8.92	32.911	25.52	5.19	0.464	0.105	82	
1	100	8.05	33.341	25.99	4.28	0.382	0.196	66	
1	120	8.00	33.570	26.17	3.79	0.338	0.240	59	
1	141	8.09	33.817	26.35	2.91	0.260	0.316	45	
1	161	7.76	33.847	26.43	2.78	0.248	0.332	43	
1	244	6.81	33.956	26.64	2.39	0.213	0.380	36	

BROWN BEAR CRUISE 322 STATION 087 INTERPOLATED AND COMPUTED VALUES

DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.35	0.00	32.271	0.000	24.79	316.9	0.000	0.00	6.65	0.00	
10	10.35	0.01	32.279	0.001	24.79	316.6	0.032	0.02	6.89	0.00	0.89
20	9.96	0.02	32.292	0.000	24.87	309.6	0.064	0.07	6.75	0.01	0.57
30	9.63	0.06	32.259	0.006	24.93	304.1	0.095	0.14	6.70	0.03	0.87
50	9.46	0.01	32.434	0.006	25.06	291.7	0.155	0.39	6.42	0.02	0.67
75	9.03	0.02	32.819	0.000	25.43	257.2	0.224	0.83	5.42	0.01	0.74
100	8.05	0.00	33.341	0.000	25.99	204.5	0.282	1.34	4.28	0.00	
150	7.96	0.02	33.843	0.008	26.39	166.8	0.376	2.52	2.81	0.03	0.59
200	7.47	0.16	34.008	0.071	26.59	148.4	0.455	3.94	2.20	0.24	1.36

BROWN BEAR CRUISE 322 STATION 87A BIOLOGICAL DATA

DATE 29/04/63 LAT 46-15 N LONG 124-58 W

DEPTH CHL-A PRODUCTIVITY SAL
LAB-I DECK-I

0 0.86 1.61 10.70 32.184

MESSANGER TIME 0447 INCOMING SOLAR RADIATION - AM 340 PM 224

BROWN BEAR CRUISE 322 STATION 088 OBSERVED VALUES

DATE 29/04/63 HR 13.7 LAT 46-16 N LONG 124-31 W SNOG 732 WEA 02 WIND VEL 14 DIR 24
BAROM 19.0 TEMP DRY 10.2 WET 8.6 RELHU 80 WTRCLR SECDI 9 SEA 2 DIR 24 SWELL 2 DIR 20
CLOUD TYPE 8 AMT 8 VIS 7 WIRE ANGLE(S) 25.30

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
1	0	10.46	32.257	24.76	6.71	0.599	-0.048	109	0.54	0.54	0.0	5
1	5	10.49	32.256	24.75	6.88	0.614	-0.063	111	0.34	0.34	1.5	4
1	9	10.49	32.262	24.76	6.79	0.606	-0.055	110	0.60	0.60	0.2	5
1	19	10.24	32.258	24.80	5.81	0.608	-0.054	110	0.63	0.63	0.2	5
1	28	9.72	32.315	24.93	5.79	0.606	-0.046	108	0.68	0.68	0.7	6
1	47	9.55	32.418	25.03	6.44	0.575	-0.013	102	0.85	0.85	2.0	6
1	70	9.00	32.797	25.42	5.48	0.489	0.079	86	1.23	1.23	7.6	12
2	81	8.45	33.232	25.84	4.60	0.411	0.163	72	1.79	1.79	18.8	23
2	122	8.33	33.659	26.19	3.34	0.298	0.275	52	2.12	2.12	26.0	32
2	164	7.80	33.885	26.45	3.89*	0.347	0.232	60	2.39	2.39	31.2	40
2	248	6.84	33.978	26.66	2.04	0.182	0.411	31	2.55	2.55	33.5	54
2	334	5.92	34.025	26.81	1.50	0.134	0.472	22	2.81	2.81	37.4	65
2	509	4.80	34.146	27.04	0.65	0.058	0.564	9	3.20	3.20	41.3	88

BROWN BEAR CRUISE 322 STATION 088 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.90	1.10		32.274
5	1.38	1.23		32.268
20	0.87	0.94		32.267
37	1.11	0.98		32.278

39.39 38.39 - WATER COLUMN VALUES

MESSANGER TIME 0623 INCOMING SOLAR RADIATION - AM 340 PM 224

BROWN BEAR			CRUISE 322			STATION 088		INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	10.46	0.00	32.257	0.000	24.76	319.8	0.000	0.00	6.71	0.00		
10	10.48	0.00	32.261	0.001	24.76	320.0	0.033	0.02	6.79	0.01	1.00	
20	10.18	0.01	32.263	0.001	24.81	315.2	0.065	0.07	6.81	0.00	0.85	
30	9.68	0.02	32.322	0.003	24.94	303.1	0.096	0.15	6.77	0.00	0.96	
50	9.48	0.01	32.459	0.005	25.08	290.3	0.156	0.39	6.33	0.01	0.86	
75	8.74	0.11	32.999	0.080	25.61	239.5	0.222	0.81	5.07	0.13	0.61	
100	8.34	0.07	33.480	0.017	26.05	198.3	0.277	1.30	3.93	0.03	0.67	
150	8.00	0.02	33.828	0.003	26.38	168.4	0.370	2.47	2.86	0.09	1.11	
200	7.38	0.00	33.957	0.018	26.57	150.9	0.450	3.90	2.27	0.13	1.03	
250	6.82	0.00	33.979	0.000	26.66	142.4	0.524	5.61	2.03	0.00	0.97	
300	6.27	0.01	34.009	0.002	26.76	133.7	0.594	7.57	1.69	0.01	0.60	
400	5.34	0.01	34.054	0.004	26.91	120.0	0.722	12.14	1.18	0.01	13.40	
500	4.82	0.00	34.135	0.001	27.03	108.9	0.837	17.45	0.70	0.00	18.46	

BROWN BEAR CRUISE 322 STATION 089 BIOLOGICAL DATA

DATE 29/04/63 LAT 46-05 N LONG 124-59 W

DEPTH	CHL-A	PRODUCTIVITY LAB-1	DECK-1	LIGHT PROD	SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	0.40	0.60	5.12	0.90 0.75 0.62 0.43	100 69 50 35		32.143	0.59	0.2	5
6	0.43	0.85	12.62	0.25	18					
19	0.40	0.69	1.06	0.00	5	50 10	32.138 32.146	0.56 0.50	0.4 0.2	5
38	0.42	0.83	0.00			1	32.162	0.57	0.2	6
100	0.06	0.00					33.300	1.80	22.0	26

15.70 26.90 152.20 - WATER COLUMN VALUES

MESSANGER TIME 2130 INCOMING SOLAR RADIATION - AM 340 PM 224

LIGHT SATURATION INCUBATOR ILLUMINATION 18700

BROWN BEAR CRUISE 322 STATION 090 OBSERVED VALUES
 DATE 29/04/63 HR 23.8 LAT 45-14 N LONG 124-38 W SNOG 929 WEA 02 WIND VEL 10 DIR 14
 BAROM 17.0 TEMP DRY 11.7 WET 9.0 RELHU 69 WTRCLR SEC DI 10 SEA 2 DIR 14 SWELL 5 DIR 22
 CLOUD TYPE 8 AMT 5 VIS 7 WIRE ANGLE(S) 26

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
1	0	10.77	31.589	24.19	7.15	0.639	-0.088	116	0.54	0.2	8
1	5	10.78	31.580	24.18	6.87	0.614	-0.063	111	0.46	0.3	9
1	9	10.77	31.602	24.20	6.81	0.608	-0.058	111	0.51	0.2	8
1	18	10.12	32.089	24.68	6.85	0.612	-0.055	110	0.53	0.3	6
1	27	9.88	32.156	24.78	6.78	0.606	-0.046	108	0.46	0.6	7
1	45	9.61	32.389	25.00	6.24	0.557	0.004	99	0.53	1.5	6
1	68	9.20	32.768	25.36	5.66	0.506	0.060	89	1.24	10.2	15
1	91	8.92	33.269	25.80	4.31	0.385	0.182	68	1.56	18.6	26
1	115	8.37	33.676	26.20	3.19	0.285	0.288	50	1.91	25.7	36
1	137	8.02	33.853	26.39	2.45	0.219	0.358	38	2.04	22.3	35
1	162	7.69	33.901	26.48	2.36	0.211	0.370	36	2.43	32.5	47
1	185	7.55	33.922	26.51	2.41	0.215	0.368	37	2.33	31.9	46
1	277	6.42	33.994	26.73	1.99	0.178	0.421	30	2.23	25.3	45

BROWN BEAR CRUISE 322 STATION 090 BIOLOGICAL DATA
 DEPTH CHL-A LAB-I PRODUCTIVITY DECK-I SAL
 0 0.91 1.06 31.537
 4 1.49 0.94 31.530
 17 0.93 0.91 31.544
 31 1.72 0.92 32.110
 39.17 28.85 - WATER COLUMN VALUES
 MESSENGER TIME 1607 INCOMING SOLAR RADIATION - AM 340 PM 224

BROWN BEAR				STATION 090				INTERPOLATED AND COMPUTED VALUES			
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.77	0.00	31.589	0.000	24.19	374.3	0.000	0.00	7.15	0.00	
10	10.71	0.02	31.652	0.017	24.24	368.8	0.038	0.02	6.81	0.01	0.97
20	10.05	0.01	32.121	0.013	24.72	323.6	0.073	0.07	6.84	0.00	0.75
30	9.83	0.01	32.188	0.002	24.81	315.3	0.105	0.15	6.71	0.01	0.93
50	9.52	0.01	32.462	0.001	25.07	290.6	0.166	0.40	6.14	0.03	0.79
75	9.12	0.01	32.920	0.008	25.49	251.0	0.234	0.83	5.28	0.04	0.69
100	8.72	0.02	33.442	0.004	25.96	206.8	0.292	1.35	3.85	0.00	0.68
150	7.83	0.00	33.890	0.006	26.45	161.5	0.385	2.51	2.34	0.03	0.67
200	7.49	0.02	33.929	0.002	26.52	154.6	0.464	3.94	2.32	0.06	19.14
250	7.07	0.07	33.953	0.007	26.61	147.8	0.541	5.69	2.14	0.05	45.73

BROWN BEAR				STATION 091				OBSERVED VALUES			
DATE	30/04/63	HR	03.1	LAT	46-13 N	LONG	124-24 W	SNDG	155	WEA	02
BAROM	TEMP	DRY	11.2	WET	9.0	RELH	75	WTRCLR	SEA	2	DIR
CLOUD	TYPE	8	AMT	6	VIS	7	WIRE	ANGLE(S)	38		
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	AOU	SATN	PHOS	NITR	SIL
1	0	11.39	21.530	16.30	7.59	0.678	-0.097	117	0.48	0.6	68
1	4	11.37	21.542	16.31	7.50	0.670	-0.089	115	0.47	0.6	67
1	8	10.53	27.991	21.43	6.61	0.590	-0.023	104	0.59	2.1	32
1	17	10.31	30.934	23.75	6.40	0.572	-0.013	102	0.63	1.9	15
1	25	10.12	31.965	24.59	6.27	0.560	-0.003	101	0.52	0.6	9
1	42	9.99	32.234	24.82	6.27	0.560	-0.002	100	0.66	1.5	9
1	63	10.03	32.266	24.84	6.13	0.547	0.004	99	0.85	3.5	10
1	85	9.55	32.932	25.43	5.02	0.448	0.112	80	1.45	14.2	20
1	104	8.25	33.705	26.24	2.93	0.262	0.313	46	2.10	28.9	40

BROWN BEAR CRUISE 322 STATION 091 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	3.80	10.65		21.504
1	7.19			21.492
4	7.36	9.67		21.492
8	3.81	9.34		21.605
100	0.43	0.37		32.003

49.67 78.66 - WATER COLUMN VALUES

MESSANGER TIME 1923 INCOMING SOLAR RADIATION - AM 340 PM 224

BROWN BEAR			CRUISE 322			STATION 091			INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO		
0	11.39	0.00	21.530	0.000	16.30	1131.8	0.000	0.00	7.59	0.00			
10	10.38	0.07	29.419	0.407	22.57	529.0	0.084	0.03	6.45	0.07	0.95		
20	10.23	0.00	31.442	0.036	24.16	376.8	0.130	0.09	6.34	0.00	0.62		
30	10.05	0.01	32.191	0.083	24.77	318.7	0.165	0.18	6.26	0.02	0.89		
50	10.02	0.03	32.231	0.036	24.81	315.6	0.229	0.44	6.28	0.03	0.69		
75	9.87	0.02	32.574	0.017	25.10	288.2	0.305	0.93	5.67	0.02	0.67		
100	8.61	0.01	33.542	0.005	26.06	197.8	0.366	1.46	3.47	0.01	4.45		

BROWN BEAR CRUISE 322 STATION 092 OBSERVED VALUES														
DATE	30/04/63	HR	05.0	LAT	46-14 N	LONG	124-16 W	SNDG	73	SEA	02	WIND	VEL 21 DIR 18	
BAROM	21.0	TEMP	DRY 11.7	WET 9.4	REL	HU 75	WTRCLR	SECD		SEA	1	DIR 18	SWELL 1 DIR 17	
CLOUD	TYPE 8	AMT 6	WIRE	ANGLE 15										
UST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	AOU	SAF	PHOS	NITR	SIL			
1	0	11.35	20.566	15.56	7.31	0.653	-0.068	112	0.53	1.5	76			
1	5	11.33	21.593	16.36	7.29	0.651	-0.070	112	0.50	1.3	70			
1	10	11.26	24.189	18.37	7.24	0.647	-0.074	113	0.44	0.4	49			
1	19	10.33	30.434	23.36	6.61	0.590	-0.030	105	0.48	0.4	11			
1	29	9.87	31.738	24.45	6.05	0.540	0.021	96	0.73	2.0	9			
1	49	9.68	32.541	25.11	5.22	0.466	0.094	83	1.33	10.2	20			
1	58	9.46	32.884	25.41	4.69	0.419	0.143	75	1.58	14.5	24			

BROWN BEAR CRUISE 322 STATION 092 INTERPOLATED AND COMPUTED VALUES												
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	11.35	0.00	20.566	0.000	15.56	1203.3	0.000	0.00	7.31	0.00		
10	11.26	0.00	24.189	0.000	18.37	931.5	0.108	0.05	7.24	0.00		
20	10.26	0.01	30.711	0.080	23.59	431.5	0.177	0.14	6.55	0.00	0.88	
30	9.85	0.01	31.807	0.019	24.51	344.0	0.216	0.24	6.01	0.01	0.97	
50	9.67	0.00	32.567	0.004	25.13	285.1	0.279	0.49	5.17	0.00	11.28	

BROWN BEAR CRUISE 322 STATION 093 OBSERVED VALUES

COLUMBIA RIVER ENTRANCE

DATE 30/04/63 HR 05.7 LAT 46-14 N LONG 124-11 W SNRG 40 WEA 02 WIND VEL 24 DIR 19
 BAROM 20.0 TEMP DRY 12.0 WET 9.7 RELHU 76 WTRCLR SECDI SEA 2 DIR 19 SWELL 1 DIR 17
 CLOUD TYPE 8 AMT 6 VIS 7 WIRE ANGLE(S) 5

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	PHOS	NITR	SII
					MGA/L	AOU	SATN		
1	0	11.26	18.651	14.10	7.24	0.647	0.054	109	0.68
1	5	11.56	22.027	16.66	7.31	0.653	0.076	113	0.50
1	10	10.68	29.085	22.26	6.87	0.614	0.053	109	0.47
1	20	10.16	31.702	24.38	5.89	0.526	0.031	94	0.51
1	30	9.96	32.369	24.93	5.91	0.528	0.030	95	0.51
								5.2	12

BROWN BEAR CRUISE 322 STATION 093 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	5.21	5.47		18.672
1	5.64	5.14		18.675
4	5.73	5.38		19.330
8	3.19	5.08		18.669
25	0.94	1.40		31.947

40.31 42.00 - WATER COLUMN VALUES

MESSANGER TIME 2204 INCOMING SOLAR RADIATION - AM 340 PM 224

BROWN BEAR			CRUISE 322			STATION 093			INTERPOLATED AND COMPUTED VALUES					
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO			
0	11.26	0.00	18.651	0.000	14.10	1345.5	0.000	0.00	7.24	0.00				
10	10.68	0.00	29.085	0.000	22.26	558.5	0.096	0.03	6.87	0.00				
20	10.16	0.00	31.702	0.000	24.38	356.4	0.142	0.10	5.89	0.00				
30	9.96	0.00	32.369	0.000	24.93	304.0	0.176	0.18	5.91	0.00				

BROWN BEAR CRUISE 322 STATION 094 OBSERVED VALUES

DATE 30/04/63													HR 07.5		LAT 46-10 N		LONG 124-15 W		SDG 77		WEA 02		WIND VEL 21 DIR 18			
BAROM 19.0													TEMP DRY 11.4		WEI 9.4		RELHU 75		WTRCLR		SEA 2		DIR 18		SWELL 2 DIR 17	
CLOUD TYPE 8													AMT 6		VIS 7		WIRE ANGLE(S) 10									
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL														
1	0	11.30	21.873	16.58	7.30	0.652	-0.072	112	112	0.55	1.0	64														
1	5	11.34	22.153	16.79	7.30	0.652	-0.073	113	113	0.52	1.1	61														
1	10	10.95	27.598	21.06	7.11	0.635	-0.072	113	113	0.47	0.5	25														
1	20	10.42	31.688	24.32	6.38	0.570	-0.015	103	103	0.73	1.5	10														
1	29	9.92	31.960	24.62	6.25	0.558	-0.001	100	100	0.74	1.4	8														
1	49	9.81	32.429	25.00	6.97	0.623	-0.063	111	111	1.01	5.9	11														
1	64	9.18	33.115	25.64	4.51	0.403	0.162	71	71	1.71	18.6	29														

BROWN BEAR		CRUISE 322		STATION 094		INTERPOLATED AND COMPUTED VALUES					
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	11.30	0.00	21.873	0.000	16.58	1104.8	0.000	0.00	7.30	0.00	
10	10.95	0.00	27.598	0.000	21.06	673.1	0.090	0.04	7.11	0.00	
20	10.42	0.00	31.688	0.000	24.32	361.6	0.142	0.11	6.38	0.00	
30	9.91	0.02	31.980	0.006	24.63	332.0	0.177	0.20	6.32	0.05	0.98
50	9.80	0.01	32.460	0.002	25.03	295.1	0.240	0.45	6.94	0.02	15.39

BROWN BEAR CRUISE 322 STATION 095 OBSERVED VALUES

CLATSOP SPIT

DATE 30/04/63 HR 09.2 LAT 46-08 N LONG 124-07 W SNRG 36 WEA SEA 4 DIR 14 SWELL DIR 14
 BAROM 18.0 TEMP DRY 11.6 WET 9.6 RELHU 75 WTRCLR
 CLOUD TYPE VIS WIRE ANGLE(S) 10

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
1	0	11.47	22.903	17.35	7.27	0.649	-0.075	113	0.50	0.50	0.6	54
1	5	11.46	22.897	17.34	7.30	0.652	-0.077	113	0.52	0.52	0.5	56
1	10	10.23	31.291	24.05	6.05	0.540	0.018	97	0.89	0.89	2.6	13
1	20	10.06	32.058	24.67	6.00	0.536	0.021	96	0.93	0.93	2.9	11
1	29	9.96	32.463	25.00	7.02	0.627	-0.070	113	1.06	1.06	5.9	15

BROWN BEAR CRUISE 322 STATION 095 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	6.41	8.29		22.793
1	6.86	7.86		22.775
4	7.02	6.38		22.793
8	2.39	2.88		30.982

46.29 47.97 - WATER COLUMN VALUES

MESSENGER TIME 0123 INCOMING SOLAR RADIATION - AM 272 PM 287

BROWN BEAR CRUISE 322 STATION 095				INTERPOLATED AND COMPUTED VALUES							
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	11.47	0.00	22.903	0.000	17.35	1030.5	0.000	0.00	7.27	0.00	
10	10.23	0.00	31.291	0.000	24.05	387.8	0.072	0.02	6.05	0.00	
20	10.06	0.00	32.058	0.000	24.67	328.5	0.108	0.07	6.00	0.00	

DATE 30/04/63 HR 12.6 LA 46-20 N LONG 124-19 W
 BAROM 15.0 TEMP DRY 10.6 WET 9.6 RELHU 87 WTRCLR
 CLOUD TYPE 8 AMT 8 VIS WIRE ANGLE(S) 30
 BROWN BEAK CRUISE 322 STATION 096
 OBSERVED VALUES
 SNDC 101 WEA 53 WIND VEL 40 DIR 18
 SECDI SEA 5 DIR 18 SWELL 3 DIR 18

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
1	0	11.00	22.528	17.13	7.22	0.645	-0.063		111
1	5	11.03			7.03	0.628			
1	9	11.04	22.520	17.12	7.18	0.641	-0.060		110
1	18	11.18	22.591	17.15	6.94	0.620	-0.041		107
1	28	10.26	21.950	21.45	6.29	0.562	0.009		98
1	46	10.09	31.290	24.07	6.22	0.556	0.004		99
1	69	9.81	32.019	24.68	5.59	0.499	0.061		89

BIOLOGICAL DATA

BROWN BEAR CRUISE 322 STATION 096

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	6.61	10.67	88.82	22.642
1	6.80	9.30		22.646
4	6.40	9.83		22.647
8	6.35	2.47		22.652

52.00 63.28 - WATER COLUMN VALUES

MESSENGER TIME 0455
 INCOMING SOLAR RADIATION - AM 272 PM 287

BROWN BEAR			CRUISE 322			STATION 096			INTERPOLATED AND COMPUTED VALUES						
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEO POT	POT ENERGY	OXY ML/L	L(O)	VAR RATIO				
0	11.00	0.00	22.528	0.000	17.13	1051.4	0.000	0.00	7.22	0.00					
10	11.07	0.02	22.415	0.073	17.03	1061.0	0.107	0.06	7.18	0.01	0.97				
20	11.02	0.05	23.541	0.215	17.91	976.2	0.209	0.21	6.81	0.02	0.78				
30	10.20	0.03	28.581	0.093	21.95	588.6	0.288	0.40	6.26	0.03	0.93				
50	9.70	0.23	31.415	0.096	24.23	371.0	0.385	0.78	5.84	0.21	14.84				

BROWN BEAR			CRUISE 322			STATION 097			OBSERVED VALUES							
										OCEANSIDE						
DATE 30/04/63			HR 14.4			LAT 46-24 N			LCNG 124-11 W			SNDG 35			WEA 51	
BAROM 17.0			TEMP DRY 10.7			WET 9.4			RELHU 93			WTRCLR			SEA 4	
CLOUD TYPE 8			VIS 5			WIRE ANGLE(S) 23						SECDI			DIR 18	
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	ADU	SATN	PHOS	NITR	SIL					
1	0	11.05	24.172	18.39	7.01	0.626	-0.051	109	0.46	0.9	47					
1	5	11.06	24.271	18.47	7.27	0.649	-0.075	113	0.44	0.9	48					
1	9	11.08	24.801	18.88	7.03	0.628	-0.056	110	0.46	1.0	41					
1	19	11.13	27.612	21.04	7.25	0.648	-0.087	115	0.41	0.7	22					

BROWN BEAR		CRUISE 322		STATION 097		INTERPOLATED AND COMPUTED VALUES					
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VCL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	11.05	0.00	24.172	0.000	18.39	929.4	0.000	0.00	7.01	0.00	
10	11.09	0.00	24.991	0.002	19.02	869.0	0.091	0.05	7.19	0.13	6.58

BROWN BEAR CRUISE 322 STATION 098
OYSTERVILLE

DATE 30/04/63 HR 16.4 LAT 46-35 N LONG 124-14 W SNDC 49 WEA 51 WIND VEL 19 DIR 22
 BAROM 17.0 TEMP DRY 10.7 WET 9.3 RELHU 87 WTRCLR SECDI 6 SEA 2 DIR 22 SWELL 3 DIR 18
 CLOUD TYPE 8 AMT 8 VIS 5 WIRE ANGLE(S) --

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
1	0	10.75	29.163	22.31	6.76	0.604	-0.044	108	0.43	0.4	0.4	17
1	5	10.79	29.163	22.30	6.74	0.602	-0.018	103	0.45	0.5	0.5	17
1	10	10.83	29.163	22.29	6.84	0.611	-0.028	105	0.55	0.3	0.3	18
1	19	10.78	29.418	22.50	6.74	0.602	-0.043	108	0.49	0.4	0.4	16
1	29	9.94	31.570	24.31	6.00	0.536	0.025	96	0.74	1.2	1.2	9
1	38	9.88	31.962	24.62	6.25	0.558	-0.002	100	0.72	1.0	1.0	8

BROWN BEAR CRUISE 322 STATION 098 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	3.40	7.98		29.168
2	3.34	6.89		29.172
7	3.39	5.67		29.173
15	3.46	5.75		29.168
40	0.76	1.25		31.928

50.98 91.93 - WATER COLUMN VALUES

MESSANGER TIME 0838 INCOMING SOLAR RADIATION - AM 272 PM 287

BROWN BEAR			CRUISE 322			STATION 098			INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO		
0	10.75	0.00	29.163	0.000	22.31	553.7	0.000	0.00	6.76	0.00			
10	10.83	0.00	29.163	0.000	22.29	555.1	0.056	0.03	6.84	0.00			
20	10.70	0.02	29.630	0.057	22.68	518.5	0.110	0.11	6.66	0.03	0.88		
30	10.15	0.16	31.745	0.020	24.41	353.2	0.154	0.22	6.24	0.17	5.86		

BROWN BEAR CRUISE 322 STATION 099 OBSERVED VALUES

DATE 30/04/63 HR 20.0 LAT 46-27 N LONG 124-27 W SNDG 130 WEA 01 WIND VEL 16 DIR 27
 BAROM 19.0 TEMP DRY 10.6 WET 8.3 RELHU 75 WTRCLR SECDI 11 SEA 1 DIR 27 SWELL 3 DIR 27
 CLOUD TYPE 8 AMT 4 VIS WIRE ANGLE(S) 23

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
1	0	10.95	29.811	22.78	6.68	0.597	-0.042	108	0.55	1.2	17
1	5	10.73	30.057	23.00	6.69	0.598	-0.041	107	0.58	1.2	17
1	9	10.66	30.527	23.38	6.74	0.602	-0.046	108	0.58	0.7	17
1	19	10.47	31.439	24.12	6.42	0.573	-0.019	103	0.61	1.1	9
1	28	10.33	31.644	24.30	6.64	0.593	-0.037	107	0.59	1.1	7
1	47	9.92	32.187	24.79	6.46	0.577	-0.018	103	0.64	0.8	7
1	71*		32.145		6.28	0.561			0.77	2.3	9
1	95	8.95	33.406	25.90	3.91	0.349	0.217	62	1.94	22.1	31

BROWN BEAR CRUISE 322 STATION 099 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	LIGHT PROD	SAT FILT	SAL	PHOS	NITR	SIL
0	1.83	5.62	35.26	2.99	100	29.782	0.60	1.5	17
5	2.11	5.30	31.32	2.55	69	29.992	0.59	1.5	16
				2.06	50				
20	1.97	2.35	7.42	2.36	35				
				1.19	18	31.143	0.61	1.2	10
37	0.63	0.71	8.74	0.17	5	32.115	0.80	2.5	8
62.57	110.65	594.36	-						

WATER COLUMN VALUES

MESSANGER TIME 1136 INCOMING SOLAR RADIATION - AM 272 PM 287

LIGHT SATURATION INCUBATOR ILLUMINATION 18900

BROWN BEAR		CRUISE 322		STATION 099		INTERPOLATED AND COMPUTED VALUES					
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.95	0.00	29.811	0.000	22.78	508.8	0.000	0.00	6.68	0.00	
10	10.64	0.00	30.643	0.005	23.47	442.4	0.048	0.02	6.71	0.02	1.00
20	10.45	0.00	31.475	0.010	24.15	377.9	0.090	0.09	6.44	0.01	0.85
30	10.29	0.00	31.698	0.003	24.35	358.9	0.127	0.18	6.65	0.01	0.97
50	9.85	0.00	32.280	0.003	24.88	309.2	0.194	0.45	6.37	0.01	21.97
75	9.26	0.03	33.013	0.029	25.54	246.3	0.264	0.89	5.14	0.06	76.00

BROWN BEAR CRUISE 322 STATION 100 OBSERVED VALUES

DATE 30/04/63 HR 22.2 LAT 46-36 N LONG 124-40 W SNCG 1472 WEA WIND VEL 14 DIR 21
 BAROM 20.0 TEMP DRY 12.2 WET 8.9 RELHU 64 WTRCLR SEA 4 DIR 24 SWELL 6 DIR 24
 CLOUD TYPE 8 AMT 1 VIS WIRE ANGLE(S) 9.5

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN AUU	SATN
1	0	10.82	31.531	24.13	6.64	0.593	-0.043	108
1	5	10.82	31.535	24.14	6.64	0.593	-0.043	108
1	10	10.63	31.638	24.25	6.74	0.602	-0.050	109
1	20	10.05	32.200	24.78	6.53	0.583	-0.026	105
1	30	9.80	32.369	24.95	6.37	0.569	-0.009	102
1	50	10.01	32.728	25.20	5.77	0.515	0.040	93
1	75	9.21	33.377	25.84	5.48	0.489	0.074	87
1	100	8.60	33.538	26.06	3.70	0.330	0.240	58
1	125	8.29	33.690	26.22	3.15	0.281	0.292	49
1	149	7.89	33.863	26.42	2.78	0.248	0.330	43
2	174	7.43	33.932	26.54	2.52	0.225	0.359	39
2	199	7.25	33.935	26.57	2.34	0.209	0.378	36
2	297	6.27	34.002	26.75	2.03	0.181	0.419	30
2	494	5.03	34.158	27.03	0.80	0.071	0.547	12

BROWN BEAR CRUISE 322 STATION 100 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.82	2.44		31.470
5	0.91	2.01		30.122
20	0.98	1.32		31.814
37	0.59	0.39		32.362
100	0.10	0.00		33.516

31.83 50.59 - WATER COLUMN VALUES

MESSANGER TIME 1441 INCOMING SOLAR RADIATION - AM 272 PM 287

BROWN BEAR				CRUISE 322				STATION 100				INTERPOLATED AND COMPUTED VALUES					
DEPTH	TEMP	E(T)		SAL	E(S)	SIGMA-T		SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)					VAR RATIO
0	10.82	0.00		31.531	0.000	24.13		379.4	0.000	0.00	6.64	0.00					
10	10.63	0.00		31.638	0.000	24.25		368.5	0.038	0.02	6.74	0.00					
20	10.05	0.00		32.200	0.000	24.78		317.8	0.073	0.07	6.53	0.00					
30	9.80	0.00		32.369	0.000	24.95		301.5	0.104	0.15	6.37	0.00					
50	10.01	0.00		32.728	0.000	25.20		278.6	0.162	0.39	5.77	0.00					
75	9.21	0.00		33.377	0.000	25.84		218.5	0.225	0.78	5.48	0.00					
100	8.60	0.00		33.538	0.000	26.06		197.9	0.277	1.25	3.70	0.00					
150	7.87	0.00		33.867	0.000	26.43		163.7	0.369	2.40	2.77	0.00					0.94
200	7.24	0.00		33.935	0.000	26.57		150.7	0.448	3.81	2.34	0.00					1.02
250	6.75	0.03		33.964	0.003	26.66		142.7	0.522	5.52	2.15	0.03					1.25
300	6.24	0.00		34.005	0.000	26.76		133.6	0.591	7.48	2.03	0.00					43.37
400	5.29	0.07		34.106	0.009	26.96		115.5	0.717	11.95	1.75	0.09					99.99

BROWN BEAR CRUISE 322 STATION 101 OBSERVED VALUES

CAPE SHOALWATER

DATE 1/05/63 HR 01.2 LAT 46-44 N LONG 124-17 W SNOG 46 WEA 02 WIND VEL 14 DIR 24
 BAROM 19.0 TEMP DRY 10.6 WET 7.7 REL HU 68 WTR CLR SEA 1 DIR 24 SWELL 1 DIR 27
 CLOUD TYPE 8 AMT 6 VIS 7 WIRE ANGLE(S) 10

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN
1	0	11.18	29.410	22.43	7.20	0.643	-0.089	116
1	5	11.20	29.424	22.43	7.08	0.632	-0.079	114
1	10	11.03	29.499	22.52	7.18	0.641	-0.087	116
1	20	11.03	29.928	22.85	7.08	0.632	-0.079	114
1	29	10.00	31.635	24.35	6.53	0.583	-0.023	104

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BROWN BEAR CRUISE 322 STATION 101 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY	SAL
		LAB-I	DECK-I
0	1.77	3.03	29.372
3	1.79	2.73	29.368
11	1.83	2.91	29.428
22	1.75	2.25	29.806
30	1.58	1.63	31.593

39.54 59.60 - WATER COLUMN VALUES

MESSANGER TIME 1707 INCOMING SOLAR RADIATION - AM 272 PM 287

DEPTH	BROWN BEAR		CRUISE 322		STATION 101		INTERPOLATED AND COMPUTED VALUES					VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)		
0	11.18	0.00	29.410	0.000	22.43	542.3	0.000	0.00	7.20	0.00		
10	11.03	0.00	29.499	0.000	22.52	533.4	0.055	0.03	7.18	0.00		
20	11.03	0.00	29.928	0.000	22.85	501.8	0.107	0.11	7.08	0.00		

BA CRUISE 001 STATION 001 BIOLOGICAL DATA

DATE 10/05/63 LAT 46-35 N LONG 127-17 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.50	20.14		32.543
0				32.550
6	0.53	21.94		32.555
15				32.528
20	0.38	1.94		32.552
40				32.529
41	0.08	0.90		32.520
55				32.528
70				32.529
100				33.319

14.27 323.22 - WATER COLUMN VALUES

MESSANGER TIME 0425 INCOMING SOLAR RADIATION - AM PM 319

BA CRUISE 001 STATION 002 BIOLOGICAL DATA
DATE 10/05/63 LAT 46-36 N LONG 128-15 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.04	3.58		32.538
5				32.578
10	0.19	2.80		32.543
25				32.537
32	0.26	0.00		32.541
50				32.540
66	0.34	0.00		32.546
75				32.531
85				32.536
100	0.08			32.762

16.28 - WATER COLUMN VALUES

MESSANGER TIME 1145 INCOMING SOLAR RADIATION - AM PM 319

BA CRUISE 001 STATION 003 BIOLOGICAL DATA
DATE 11/05/63 LAT 46-24 N LONG 125-31 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.60	8.64		31.034
5	0.64	9.48		31.043
16	1.19	4.82		31.976
32	0.89	1.56		32.256
50				32.268
65				32.480

29.83 - WATER COLUMN VALUES

MESSANGER TIME 0430 INCOMING SOLAR RADIATION - AM 275 PM 258

BA CRUISE 001 STATION 004 BIOLOGICAL DATA

DATE 11/05/63 LAT 46-17 N LONG 124-25 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	1.87	15.44		16.034
1	1.97	18.44		17.253
5	1.86	4.44		25.766
10	1.16	0.88		31.473
25				32.235
40				32.280
55				32.533
70				32.754
85				33.247
100	0.19			33.593

76.64 - WATER COLUMN VALUES

MESSSENGER TIME 1155 INCOMING SOLAR RADIATION - AM 275 PM 258

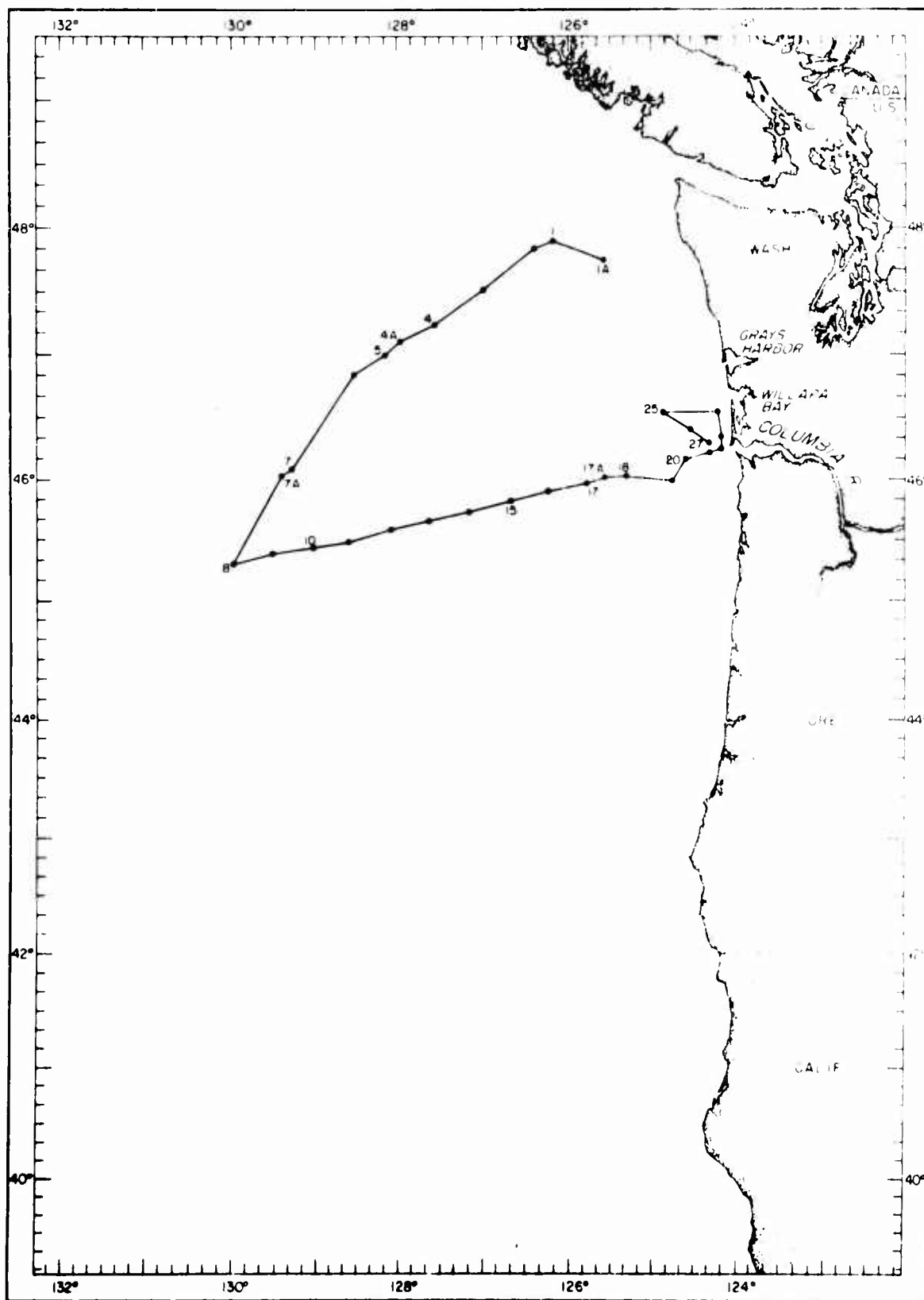


Fig. 3. Station locations Brown Bear Cruise 323, 13-19 May 1963.

BROWN BEAR CRUISE 323 STATION 01A BIOLOGICAL DATA

DATE 14/05/63 LAT 48-07 N LONG 125-34 W

DEPTH CHL-A PRODUCTIVITY
LAB-I DECK-I SAL

0 0.01 1.40 10.58 30.903

MESSANGER TIME 0435 INCOMING SOLAR RADIATION - AM 242 PM 200

BROWN BEAR CRUISE 323 STATION 001 OBSERVED VALUES

DATE 14/05/63 HR 17.2 LAT 47-54 N LONG 126-12 W SNRG 1783 WEA 01 WIND VEL 3 DIR 18
BAROM 19.0 TEMP DRY 10.9 WET 8.9 RELHU 78 WTRCLR SECDI SEA 1 DIR 18 SWELL 1 DIR 22
CLOUD TYPE 3 AMT 6 VIS 9 WIRE ANGLE(S) 5

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN
1	0	11.04	32.162	24.58	6.79	0.606	-0.061	111
1	5	11.08	32.154	24.57	7.07	0.631	-0.087	116
1	10	11.00	32.163	24.59	7.56	0.675	-0.130	124
1	20	10.33	32.260	24.78	7.66	0.684	-0.131	124
1	30	9.80	32.377	24.96	10.58*	0.944	-0.386	169
1	49	9.85	32.523	25.07	7.07	0.631	-0.073	113
1	74	8.56	32.834	25.51	8.62*	0.770	-0.196	134
1	99	7.84	33.349	26.02	7.25	0.648	-0.066	111
1	123	7.81	33.668	26.28	5.52	0.493	0.087	85
1	148	7.61	33.790	26.40	4.86	0.434	0.149	74
1	173	7.40	33.884	26.51	4.61	0.412	0.173	70
1	197	7.16	33.931	26.58	4.14	0.370	0.219	63
1	296	6.16	33.996	26.76	2.37	0.212	0.391	35

BROWN BEAR CRUISE 323 STATION 001 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.61	1.01		32.155
5	0.52	0.95		32.153
17	1.35	1.58		32.233
34	0.66	0.40		32.445

31.15 36.91 - WATER COLUMN VALUES

MESSANGER TIME 0934 INCOMING SOLAR RADIATION - AM 242 PM 200

BROWN BEAR CRUISE 323 STATION 001			INTERPOLATED AND COMPUTED VALUES								
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	11.04	0.00	32.162	0.000	24.58	336.4	0.000	0.00	6.79	0.00	
10	11.00	0.00	32.163	0.000	24.59	335.8	0.034	0.02	7.56	0.00	
20	10.33	0.00	32.260	0.000	24.78	317.8	0.067	0.07	7.66	0.00	
30	9.80	0.00	32.377	0.000	24.96	300.9	0.098	0.15	7.50	0.07	1.05
50	9.81	0.01	32.532	0.000	25.08	289.9	0.158	0.39	7.09	0.02	0.98
75	8.52	0.00	32.854	0.002	25.54	247.0	0.226	0.82	7.39	0.28	0.94
100	7.83	0.01	33.366	0.000	26.04	199.6	0.282	1.32	7.18	0.01	0.94
150	7.59	0.00	33.799	0.000	26.41	164.9	0.374	2.47	4.84	0.01	0.89
200	7.13	0.00	33.935	0.000	26.58	149.2	0.453	3.89	4.07	0.00	6.83
250	6.59	0.01	33.958	0.011	26.68	140.9	0.526	5.57	2.89	0.09	67.71

BROWN BEAR CRUISE 323 STATION 002 OBSERVED VALUES
 DATE 14/05/63 HR 20.2 LAT 47-50 N LONG 126-25 W SNOG 2195 WEA 01 WIND VEL 10 DIR 19
 BAROM 19.0 TEMP DRY 11.8 WET 10.1 RELHU 81 WTRCLR SECD1 SEA 1 DIR 19 SWELL 1 DIR 19
 CLOUD TYPE 3 AMT 6 VIS 9 WIRE ANGLE(S) ---

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
1	0	10.96	32.191	24.62	6.64	0.593	-0.047	109	0.53	0.4	7
1	5	11.01	32.219	24.63	6.64	0.593	-0.048	109	0.49	0.4	6
1	10	11.93	32.234	24.66	6.80	0.607	-0.061	111	0.57	0.4	6
1	20	10.62	32.248	24.72	6.79	0.606	-0.057	110	0.58	0.3	8
1	30	9.90	32.470	25.02	6.71	0.599	-0.042	107	0.68	1.3	6
1	48	9.68	32.460	25.05	6.38	0.570	-0.009	102	0.80	1.6	6
1	73	8.86	32.564	25.26	5.69	0.508	0.063	89	1.01	3.3	13
1	98	8.00	33.134	25.83	4.65	0.415	0.165	72	1.54	6.1	25
1	122	7.91	33.544	26.17	4.11	0.367	0.212	63	1.81	7.6	34
1	147	7.71	33.744	26.35	3.12	0.279	0.303	48	1.94	7.2	40
1	172	7.46	33.856	26.48	2.76	0.247	0.338	42	2.15	10.0	44
1	195	7.22	33.897	26.54	2.76	0.247	0.341	42	2.27	10.2	46
1	295	6.13	33.992	26.76	1.77	0.158	0.445	26	2.41	12.3	62

BROWN BEAR CRUISE 323 STATION 002 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	CRUISE 323	STATION 002	IRRAD	SAL	PHOS	NITR	SIL
0	0.60	1.09	8.10	1.37 1.22 1.13 0.94	100 59 46 32	32.173	0.55	0.2	5
6	0.72	0.99	6.44	0.51	16				
18	1.03	0.74	2.32	0.15	5	32.101 32.229	0.54 0.57	0.2 0.2	8 7
31	1.02	0.62	0.50		1	32.403	0.82	0.9	7
150	0.05					33.298	2.03	6.4	29
200	0.01					33.862	2.05	8.7	38

27.83 25.39 114.54 - WATER COLUMN VALUES

MESSANGER TIME 1133 INCOMING SOLAR RADIATION - AM 242 PM 200

LIGHT SATURATION INCUBATOR ILLUMINATION 23600

DEPTH	TEMP	E(T)	SAL	E(S)	STATION 002	INTERPOLATED AND COMPUTED VALUES	VAR RATIO
0	10.96	0.00	32.191	0.000	24.62	SP VOL ANOMALY	
10	10.93	0.00	32.234	0.000	24.66	332.9	0.00
20	10.62	0.00	32.248	0.000	24.72	329.4	0.02
30	9.90	0.00	32.470	0.000	25.02	323.4	0.07
50	9.63	0.01	32.457	0.004	25.05	295.6	0.15
75	8.78	0.01	32.604	0.008	25.30	292.6	0.39
100	7.98	0.01	33.175	0.001	25.87	269.3	0.84
150	7.68	0.00	33.762	0.000	26.37	215.9	1.38
200	7.17	0.00	33.901	0.001	26.55	168.9	2.60
250	6.62	0.00	33.902	0.021	26.63	152.2	4.04
						145.6	5.77
						0.467	0.11
						0.542	0.14
						2.58	8.26
						2.20	72.97

DATE 15/05/63 HR 02.0 LAT 47-31 N LONG 127-01 W
 BAROM 18.0 TEMP DRY 11.2 WET 10.3 RELHU 91 WIRCLR
 CLOUD TYPE 8 AMT 6 VIS 7 WIRE ANGLE(S) 9
 BROWN BEAR CRUISE 323 STATION 003
 OBSERVED VALUES
 SNRG 2487 WEA 02 WIND VEL 9 DIR 23
 SECDI SEA 2 DIR 23 SWELL 1 DIR 20

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
1	0	10.39	32.435	24.91	6.55	0.585	-0.033		106
1	5	10.36	32.425	24.91	6.55	0.585	-0.033		106
1	10	10.35	32.419	24.90	6.59	0.589	-0.036		107
1	20	10.23	32.442	24.94	6.45	0.576	-0.022		104
1	30	9.88	32.487	25.03	6.46	0.577	-0.019		103
1	39	9.53	32.444	25.06	6.55	0.585	-0.022		104
1	49	9.52	32.470	25.08	6.42	0.573	-0.011		102
1	74	9.37	32.546	25.16	6.07	0.542	0.022		96
1	99	7.56	32.920	25.73	5.51	0.492	0.095		84
1	123	7.19	33.324	26.10	4.23	0.378	0.213		64
1	148	6.90	33.615	26.36	4.49	0.401	0.192		69
1	173	6.99	33.787	26.49	4.05	0.362	0.230		61
1	197	6.91	33.889	26.58	3.45	0.308	0.284		52
1	296	5.54	33.904	26.77	2.49	0.222	0.390		36

DEPTH	CHL-A	BROWN BEAR	CRUISE 323	STATION 003	BIOLOGICAL DATA
		PRODUCTIVITY LAB-I	DECK-I	SAL	
0	0.16	0.32		32.432	
8	0.18	0.34		32.421	
25	0.18	0.10		32.416	
50	0.18	0.23		32.398	
	8.97	10.54	-	WATER COLUMN VALUES	

MESSANGER TIME 1813 INCOMING SOLAR RADIATION - AM 242 PM 200

DEPTH	BROWN BEAR		CRUISE 323		STATION 003		INTERPOLATED AND COMPUTED VALUES					
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEO POT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	10.39	0.00	32.435	0.000	24.91	305.5	0.000	0.00	6.55	0.00		
10	10.35	0.00	32.419	0.000	24.90	306.2	0.031	0.02	6.59	0.00		
20	10.23	0.00	32.442	0.000	24.94	302.7	0.062	0.06	6.45	0.00		
30	9.88	0.00	32.487	0.000	25.03	294.0	0.092	0.14	6.46	0.00		
50	9.53	0.01	32.470	0.002	25.08	290.2	0.151	0.38	6.41	0.00	1.00	
75	9.30	0.02	32.558	0.002	25.18	280.6	0.223	0.84	6.06	0.00	0.94	
100	7.53	0.01	32.938	0.001	25.74	227.3	0.287	1.41	5.45	0.01	0.94	
150	6.90	0.01	33.632	0.001	26.38	167.9	0.386	2.65	4.47	0.01	0.89	
200	6.89	0.00	33.898	0.000	26.59	148.7	0.466	4.07	3.37	0.00	6.83	
250	6.31	0.02	33.990	0.008	26.74	135.0	0.538	5.72	2.79	0.11	67.71	

BROWN BEAR CRUISE 323 STATION 004 OBSERVED VALUES											
DATE 15/05/63	HR 07.6	LAT 47-15 N	LONG 127-34 W	SNDG 2560	WEA 01	WIND VEL 16 DIR 27					
BAROM 19.0	TEMP DRY 10.0	WET 7.5	RELHU 77	WTRCLR	SEA 1	DIR 27	SWELL 1	DIR 28			
CLOUD TYPE	AMT 1	VIS 7	WIRE ANGLE(S) 10								
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN MGA/L	AOU	SATN	PHOS	NITR	SIL
1	0	10.34	32.538	25.00	6.78	0.606	-0.054	110	0.73	1.3	5
1	5	10.37	32.541	24.99	8.91	0.796	-0.244	144	0.74	1.0	5
1	10	10.40	32.544	24.99	8.83	0.789	-0.237	143	0.79	1.0	5
1	20	10.39	32.524	24.98	11.13*	0.994	-0.443	180	0.77	1.0	4
1	30	9.94	32.498	25.03	6.64	0.593	-0.036	106	0.78	1.2	5
1	39	9.66	32.520	25.10	6.93	0.619	-0.058	110	0.82	1.4	6
1	49	9.60	32.520	25.11	7.19	0.642	-0.081	114	0.80	1.0	6
1	74	9.57	32.543	25.13	7.49	0.669	-0.107	119	0.86	1.3	6
1	99	9.30	32.587	25.21	6.40	0.572	-0.007	101	0.98	2.3	8
1	123	7.54	33.182	25.94	5.19	0.464	0.123	79	1.52	6.1	25
1	147	7.01	33.418	26.19	5.23	0.467	0.126	79	1.66	6.8	29
1	172	7.19	33.726	26.41	4.26	0.380	0.208	65	1.74	7.4	31
1	196	6.94	33.851	26.54	4.19	0.374	0.218	63	1.90	7.5	40
1	295	5.50	33.917	26.78	2.55	0.228	0.385	37	2.35	11.4	56

BROWN BEAR CRUISE 323 STATION 004 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.19	0.33		32.524
8	0.23	0.29		32.527
25	0.24	0.30		32.525
50	0.34	0.14		32.509
100	0.04	0.02		32.973

12.82 12.89 - WATER COLUMN VALUES

MESSENGER TIME 0210 INCOMING SOLAR RADIATION - AM 333 PM 329

ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0052-0117 DEPTHS 100, 70
0135-0155 35, 0

DEPTH	BROWN BEAR		CRUISE 323		STATION 004		INTERPOLATED AND COMPUTED VALUES							VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VCL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)				
0	10.34	0.00	32.538	0.000	25.00	297.0	0.000	0.00	6.78	0.00	1.49			
10	10.40	0.00	32.544	0.000	24.99	297.7	0.030	0.02	8.83	0.00				
20	10.39	0.00	32.524	0.000	24.98	299.3	0.061	0.06	7.68	0.29				
30	9.94	0.00	32.498	0.000	25.03	294.2	0.090	0.14	6.64	0.00				
50	9.60	0.00	32.520	0.000	25.11	287.5	0.149	0.38	7.22	0.01	1.00			
75	9.58	0.01	32.539	0.004	25.12	286.2	0.221	0.84	7.46	0.01	0.94			
100	9.23	0.02	32.610	0.006	25.23	275.1	0.292	1.48	6.34	0.01	0.94			
150	7.02	0.02	33.458	0.004	26.22	182.5	0.408	2.90	5.12	0.03	0.85			
200	6.87	0.01	33.860	0.003	26.56	151.3	0.492	4.39	3.79	0.25	7.62			
250	5.82	0.14	34.040	0.042	26.84	125.1	0.561	5.99	3.08	0.33	67.76			

BROWN BEAR CRUISE 323 STATION 04A BIOLOGICAL DATA

DATE 15/05/63 LAT 47-06 N LONG 127-58 W

DEPTH CHL-A LAB-I PRODUCTIVITY DECK-I SAL

0 0.24 0.38 4.56 32.393

MESSANGER TIME 0432 INCOMING SOLAR RADIATION - AM 333 PM 329

BROWN BEAR CRUISE 323 STATION 005 OBSERVED VALUES

DATE 15/05/63 HR 14.6 LAT 47-00 N LONG 128-10 W WIND VEL 12 DIR 26
 BAROM 23.0 TEMP DRY 9.7 WET 7.7 RELHU 90 WTRCLR SEA 3 DIR 26 SWELL 1 DIR 26
 CLOUD TYPE 8 AMT 5 VIS 7 WIRE ANGLE(S) 15, 5

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN
2	0	10.12	32.360	24.89	6.45	0.576	-0.021	104	
2	5	10.16	32.390	24.91	6.88	0.614	-0.060	111	
2	10	10.18	32.393	24.91	6.47	0.578	-0.023	104	
2	20	10.12	32.397	24.92	6.47	0.578	-0.023	104	
2	30	9.90	32.435	24.99	6.54	0.584	-0.026	105	
2	39	9.14	32.399	25.08	6.50	0.581	-0.013	102	
2	49	9.15	32.380	25.07	6.28	0.561	0.007	99	
2	74	9.02	32.498	25.18	6.27	0.560	0.009	98	
2	99	7.66	32.979	25.76	5.19	0.464	0.122	79	
2	123	7.06	33.402	26.17	4.58	0.409	0.183	69	
2	148	7.15	33.730	26.42	3.74	0.334	0.255	57	
2	173	7.08	33.858	26.53	3.30	0.295	0.295	50	
1	189	6.83	33.908	26.60	3.30	0.295	0.298	50	
1	285	5.83	33.962	26.78	2.13	0.190	0.417	31	
1	477	4.50	34.076	27.02	0.97	0.087	0.541	14	
1	718	3.89	34.278	27.25	0.29	0.026	0.610	4	
1	960	3.31	34.379	27.38	0.32	0.029	0.617	4	
1	1446	2.48	34.512	27.56	0.67	0.060	0.599	9	
1	1737	2.13	34.568	27.64	1.08	0.096	0.568	15	

BROWN BEAR CRUISE 323 STATION 005 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.26	0.54		32.492
8	0.23			32.381
25	0.23	0.46		32.386
50	0.42	0.38		32.401

13.96 23.00 - WATER COLUMN VALUES

MESSANGER TIME 0713 INCOMING SOLAR RADIATION - AM 333 PM 329

BROWN BEAR			CRUISE 323			STATION 005		INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	10.12	0.00	32.360	0.000	24.89	306.7	0.000	0.00	6.45	0.00		
10	10.18	0.00	32.393	0.000	24.91	305.4	0.031	0.02	6.47	0.00		
20	10.12	0.00	32.397	0.000	24.92	304.3	0.062	0.06	6.47	0.00		
30	9.90	0.00	32.435	0.000	24.99	298.2	0.092	0.14	6.54	0.00		
50	9.16	0.01	32.379	0.001	25.07	291.3	0.152	0.38	6.28	0.01	1.00	
75	8.97	0.01	32.514	0.003	25.20	278.8	0.224	0.84	6.23	0.01	0.94	
100	7.62	0.00	32.998	0.000	25.78	224.0	0.287	1.40	5.16	0.00	0.94	
150	7.15	0.00	33.745	0.002	26.43	162.9	0.384	2.62	3.69	0.00	0.89	
200	6.69	0.01	33.925	0.007	26.64	144.0	0.462	3.99	3.21	0.04	1.45	
250	6.13	0.02	33.967	0.016	26.74	134.5	0.532	5.61	2.65	0.09	1.75	
300	5.70	0.00	33.970	0.000	26.80	129.4	0.599	7.19	2.00	0.01	0.97	
400	4.93	0.01	34.027	0.001	26.93	117.2	0.723	11.52	1.31	0.04	0.75	
500	4.42	0.02	34.096	0.002	27.05	107.1	0.836	17.14	0.87	0.00	0.89	
600	4.11	0.05	34.181	0.007	27.15	98.2	0.940	22.98	0.52	0.01	0.67	
700	3.91	0.01	34.264	0.002	27.23	90.8	1.035	29.35	0.31	0.00	0.90	
800	3.69	0.00	34.319	0.003	27.30	84.9	1.124	36.19	0.25	0.02	0.66	
1000	3.23	0.00	34.393	0.001	27.40	75.8	1.287	51.15	0.33	0.00	0.96	
1200	2.85	0.01	34.454	0.002	27.48	68.3	1.433	67.60	0.44	0.00	0.89	
1500	2.41	0.00	34.523	0.000	27.58	59.8	1.628	94.52	0.73	0.00	1.22	

BROWN BEAR CRUISE 323 STATION 006 OBSERVED VALUES
 DATE 15/05/63 HR 20.2 LAT 46-51 N LONG 128-33 W SNRG 2698 WEA 01 WIND VEL 2 DIR 25
 BAROM 26.0 TEMP DRY 12.3 WET 9.3 RELHU 68 WTRCLR SECDI SEA 1 DIR 25 SWELL 1 DIR 28
 CLOUD TYPE 3 AMT 3 VIS 8 WIRE ANGLE(S) 3, 3, 3

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
3	0	10.57	32.390	24.84	6.91	0.617	-0.067	112	0.78	3.1	8	
3	5	10.49	32.396	24.86	6.97	0.623	-0.072	113	0.82	3.3	8	
3	10	10.22	32.397	24.91	7.26	0.648	-0.094	117	0.82	3.5	8	
3	20	10.15	32.382	24.91	7.17	0.640	-0.085	115	0.83	3.4	8	
1	30	9.19	32.407	25.08	7.04	0.629	-0.062	111	0.82	3.7	8	
1	39	9.17	32.412	25.09	6.99	0.624	-0.057	110	0.82	3.3	7	
1	48	9.10	32.415	25.10	6.62	0.591	-0.023	104	0.91	4.4	9	
1	73	9.38	32.529	25.15	6.59	0.589	-0.024	104	0.91	3.4	7	
1	98	7.37	33.194	25.97	5.43	0.485	0.104	82	1.71	19.4	27	
1	121	6.93	33.498	26.27	4.77	0.426	0.167	72	1.82	22.5	32	
2	146	6.92	33.747	26.46	4.26	0.380	0.212	64	1.89	24.3	36	
2	170	6.67	33.890	26.58	3.39	0.303	0.290	51	2.03	25.1	40	
2	194	6.67	33.912	26.63	3.36	0.300	0.295	50	2.13	27.7	48	
2	292	5.73	33.972	26.80	2.18	0.195	0.414	32	2.40	36.3	63	

BROWN BEAR CRUISE 323 STATION 006 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	LIGHT PROD	SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	0.15	0.42	2.84	0.35	100	50	32.390	0.89	3.2	8
12	0.20	0.34	1.84	0.34	59		32.377	0.88	3.1	7
				0.32	46					
				0.25	32					
				0.13	16					
				0.01	5					
32	0.28	0.29	0.40			10	32.402	0.95	3.5	9
48	0.31	0.21	0.38			1	32.408	0.95	3.8	9

11.63 14.89 56.72 - WATER COLUMN VALUES

MESSANGER TIME 1144 INCOMING SOLAR RADIATION - AM 333 PM 329

LIGHT SATURATION INCUBATOR ILLUMINATION 20700

DEPTH	TEMP	E(T)	SAL	E(S)	STATION 006 SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	10.57	0.00	32.350	0.000	24.84	311.7	0.000	0.00	6.91	0.00	
10	10.22	0.00	32.397	0.000	24.91	305.7	0.032	0.02	7.26	0.00	
20	10.15	0.00	32.382	0.000	24.91	305.9	0.062	0.06	7.17	0.00	
30	9.19	0.00	32.407	0.000	25.08	289.3	0.092	0.14	7.04	0.00	
50	9.15	0.04	32.411	0.005	25.09	288.8	0.151	0.38	6.61	0.03	1.02
75	9.23	0.05	32.578	0.011	25.21	278.0	0.222	0.84	6.51	0.02	0.89
100	7.30	0.01	33.228	0.003	26.01	202.5	0.283	1.37	5.36	0.00	0.88
150	6.92	0.00	33.778	0.001	26.49	157.3	0.373	2.50	4.10	0.03	0.79
200	6.60	0.00	33.964	0.031	26.68	140.1	0.448	3.84	2.97	0.25	9.88
250	6.00	0.05	34.009	0.038	26.79	129.7	0.516	5.40	2.44	0.30	70.50

BROWN BEAR CRUISE 323 STATION 007 OBSERVED VALUES
 DATE 16/05/63 HR 07.9 LAT 46-06 N LONG 129-18 W SNDC 2652 WEA 00 WIND VEL 5 DIR 27
 BAROM 27.0 TEMP DRY 11.1 WET 8.7 RELHU 73 WTRCLR SEA 1 DIR 27 SWELL 1 DIR 28
 CLOUD TYPE VIS 9 WIRE ANGLE(S) 2
 CST DEPTH TEMP SAL SIGMA-T ML/L MGA/L OXYGEN AUO SATN PHOS NITR SIL

1	0	11.31	32.565	24.85	7.02	0.627	-0.087	116	0.60	0.7	2
1	5	11.31	32.568	24.85	6.91	0.617	-0.077	114	0.62	0.7	2
1	10	10.82	32.562	24.93	7.07	0.631	-0.085	116	0.70	1.0	2
1	20	10.70	32.579	24.97	7.22	0.645	-0.097	118	0.70	1.1	3
1	30	10.34	32.567	25.02	6.69	0.598	-0.046	108	0.70	1.6	4
1	39	9.99	32.565	25.08	6.63	0.592	-0.036	106	0.74	1.7	3
1	49	9.88	32.560	25.09	6.74	0.602	-0.044	108	0.71	1.5	4
1	74	9.74	32.562	25.11	6.76	0.604	-0.044	108	0.82	2.7	5
1	99	8.18	33.176	25.84	4.70	0.420	0.158	73	1.60	18.6	24
1	123	7.90	33.525	26.15	3.99	0.356	0.223	61	1.90	23.7	31
1	148	7.66	33.713	26.33	3.70	0.330	0.252	57	2.08	26.3	37
1	173	7.39	33.811	26.45	3.80	0.339	0.246	58	1.97	34.1	39
1	197	7.06	33.880	26.55	3.46	0.309	0.281	52	2.06	29.1	44
1	296	5.86	33.945	26.76	2.51	0.224	0.383	37	2.53	35.1	61

BROWN BEAR CRUISE 323 STATION 007 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.23	0.40		32.568
12	0.26	0.39		32.554
32	0.28	0.29		32.568
48	0.18	0.12		32.566
100	0.02	0.02		33.149

12.07 14.82 - WATER COLUMN VALUES

MESSANGER TIME 2245 INCOMING SOLAR RADIATION - AM 333 PM 329

ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0141-0151 DEPTHS 100, 70
0213-0223 35, 0

INTERPOLATED AND COMPUTED VALUES											
DEPTH	BROWN BEAR	CRUISE 323	STATION 007								
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOY ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	11.31	0.00	32.565	0.000	24.85	311.2	0.000	0.00	7.02	0.00	
10	10.82	0.00	32.562	0.000	24.93	303.3	0.031	0.02	7.07	0.00	
20	10.70	0.00	32.579	0.000	24.97	300.3	0.062	0.06	7.22	0.00	
30	10.34	0.00	32.567	0.000	25.02	295.5	0.092	0.14	6.69	0.00	
50	9.89	0.01	32.554	0.004	25.08	289.5	0.151	0.38	6.76	0.01	1.00
75	9.68	0.02	32.583	0.006	25.14	284.6	0.223	0.54	6.68	0.02	0.94
100	8.16	0.01	33.195	0.000	25.86	216.9	0.286	1.40	4.65	0.01	0.94
150	7.64	0.00	33.723	0.001	26.35	171.2	0.384	2.63	3.71	0.01	0.89
200	7.02	0.00	33.887	0.000	26.56	151.2	0.465	4.07	3.40	0.01	6.83
250	6.29	0.03	33.961	0.001	26.72	136.9	0.538	5.74	3.10	0.16	67.71

BROWN BEAR CRUISE 323 STATION 07A BIOLOGICAL DATA

DATE 16/05/63 LAT 46-02 N LONG 129-24 W

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
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0	0.08	0.58	6.30	32.585
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MESSENGER TIME 0433 INCOMING SOLAR RADIATION - AM 349 PM 380

BROWN BEAR CRUISE 323 STATION 008 OBSERVED VALUES

DATE 16/05/63 HR 18.8 LAT 45-18 N LONG 130-00 W SNDC 2377 WEA 01 WIND VEL 2 DIR 07
 BAROM 30.0 TEMP DRY 13.0 WET 9.4 RELHU 62 WTRCLR SECDI SEA 1 DIR 07 SWELL 1 DIR 27
 CLOUD TYPE 8 AMT 1 VIS 9 WIRE ANGLE(S) 2, 1, 2

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN /L	AOU	SATN	PHOS	NITR	SIL
3	0	11.82	32.564	24.75	7.54	0.673	-0.139	26	1.8	0.71	1.8	3
3	5	11.22	32.548	24.85	7.03	0.628	-0.087	16	1.8	0.70	1.8	3
3	10	10.86	32.550	24.92	6.90	0.616	-0.071	13	1.8	0.74	1.8	3
3	20	10.68	32.554	24.95	6.66	0.595	-0.047	109	2.0	0.75	2.0	4
3	30	9.99	32.551	25.07	7.2	0.600	-0.043	108	2.0	0.76	2.0	5
3	39	9.91	32.550	25.08	7.25	0.648	-0.089	116	2.5	0.80	2.5	5
3	49	9.85	32.555	25.09	7.10	0.634	-0.076	114	2.7	0.77	2.7	5
3	74	9.82	32.544	25.09					3.8	0.84	3.8	6
3	99	8.02	33.085	25.79	5.29	0.472	0.107	81	17.1	1.49	17.1	21
3	123	7.18	33.377	26.14	5.13	0.456	0.132	78	18.5	1.52	18.5	24
3	148	7.27	33.654	26.34	4.75	0.424	0.164	72	22.3	1.64	22.3	29
3	175	7.26	33.871	26.52	3.57	0.319	0.268	54	27.0	1.98	27.0	39
1	197	6.92	33.919	26.60					29.5	2.04	29.5	45
1	296	5.84	33.944	26.76					35.1	2.18	35.1	62
1	493	4.66	34.085	27.01					42.1	2.71	42.1	89
1	740	4.04	34.284	27.23					42.8	2.90	42.8	114
1	988	3.32	34.400	27.40					43.3	2.89	43.3	129
1	1483	2.45	34.519	27.57					43.4	2.78	43.4	148
1	1780	2.10										
2	1824	2.04	34.583	27.66						2.74	42.1	156

BROWN BEAR CRUISE 323 STATION 008 BIOLOGICAL DATA										
DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	LIGHT PROD	SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	0.07	0.12	1.14				32.566	0.73	2.3	2
8	0.11	0.15	1.30			50	32.551	0.80	2.2	3
36	0.11	0.10	0.10	0.18	100	10	32.554	0.82	2.8	5
				0.16	59					
				0.18	46					
				0.20	32					
				0.07	16					
				0.01	5					
53	0.23	0.07	0.10			1	32.564	0.90	3.0	5

6.69 5.89 31.08 - WATER COLUMN VALUES

MESSENGER TIME 1156 INCOMING SOLAR RADIATION - AM 349 PM 380

LIGHT SATURATION INCUBATOR ILLUMINATION 19500

DEPTH	BROWN BEAR		CRUISE 323		STATION 008		INTERPOLATED AND COMPUTED VALUES						VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)			
0	11.82	0.00	32.564	0.000	24.75	320.1	0.000	0.00	7.54	0.00	0.91		
10	10.86	0.00	32.550	0.000	24.92	304.9	0.032	0.02	6.90	0.00			
20	10.68	0.00	32.554	0.000	24.95	301.8	0.063	0.06	6.66	0.00			
30	9.99	0.00	32.551	0.000	25.07	291.0	0.092	0.14	6.57	0.02			
50	9.86	0.01	32.550	0.004	25.08	289.5	0.151	0.38	7.28	0.00	1.00		
75	9.76	0.02	32.563	0.005	25.11	287.3	0.224	0.85	7.03	0.02			
100	7.97	0.00	33.100	0.001	25.81	221.3	0.288	1.41	5.27	0.01			
150	7.28	0.00	33.675	0.001	26.36	169.8	0.386	2.64	4.70	0.00			
200	6.88	0.00	33.922	0.002	26.61	146.8	0.466	4.06			1.07		
250	6.28	0.02	33.950	0.014	26.71	137.5	0.538	5.71					
300	5.81	0.00	33.946	0.000	26.77	132.6	0.606	7.63					
400	5.10	0.03	34.010	0.004	26.90	120.4	0.733	12.19					
500	4.64	0.00	34.091	0.000	27.02	110.0	0.850	17.55			0.97		
600	4.34	0.04	34.175	0.004	27.12	101.3	0.956	23.56					
700	4.11	0.02	34.254	0.002	27.20	93.7	1.055	30.13					
800	3.86	0.01	34.318	0.001	27.28	87.0	1.146	37.16					
1000	3.29	0.00	34.404	0.000	27.40	75.7	1.311	52.28			0.99		
1200	2.88	0.02	34.462	0.005	27.49	68.0	1.456	68.69					
1500	2.43	0.00	34.522	0.000	27.58	60.2	1.651	95.62					

BROWN BEAR CRUISE 323 STATION 009 OBSERVED VALUES
 DATE 17/05/63 HR 00.3 LAT 45-24 N LONG 129-32 W SNUG 2560 WEA 02 WIND VEL 7 DIR 03
 BAROM 30.0 TEMP DRY 10.7 WET 8.5 RELHU 75 WTRCLR SECDI SEA 1 DIR 03 SWELL 2 DIR 32
 CLOUD TYPE 8 AMT 1 VIS 7 WIRE ANGLE(S) 0

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
1	0	12.36	32.644	24.71	6.83	0.610	-0.082	116	116	0.46	0.2	0
1	5	11.66	32.625	24.83	6.64	0.593	-0.057	111	111	0.58	0.2	0
1	10	11.42	32.634	24.88	6.72	0.600	-0.062	111	111	0.57	0.4	0
1	20	11.15	32.640	24.93	6.65	0.594	-0.052	110	110	0.64	0.1	1
1	30	10.53	32.670	25.07	6.51	0.581	-0.032	106	106	0.70	1.7	2
1	39	10.39	32.633	25.06	6.43	0.574	-0.023	104	104	0.76	1.3	2
1	49	10.30	32.641	25.08	6.37	0.569	-0.017	103	103	0.73	1.7	2
1	74	10.30	32.633	25.08	6.23	0.556	-0.004	101	101	0.81	2.0	3
1	99	8.28	33.084	25.75	5.11	0.456	0.120	79	79	1.58	16.0	20
1	123	7.44	33.424	26.14	4.83	0.431	0.155	74	74	1.77	21.2	28
1	148	6.86	33.517	26.29	4.82	0.430	0.164	72	72	1.82	21.5	32
1	173	7.18	33.836	26.50	3.98	0.355	0.233	60	60	1.62	21.0	28
1	197	6.97	33.891	26.57	3.73	0.333	0.258	56	56	2.09	26.7	41
1	296	5.99	33.967	26.76	2.40	0.214	0.391	35	35	2.55	34.5	59

BROWN BEAR CRUISE 323 STATION 009 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY	SAL
	LAB-I	DECK-I	
0	0.19	0.56	32.653
8	0.24	0.44	32.650
36	0.32	0.26	32.647
53	0.36	0.14	32.655

15.34 17.12 - WATER COLUMN VALUES

MESSENGER TIME 1635 INCOMING SOLAR RADIATION - AM 349 PM 380

DEPTH	BROWN BEAR	TEMP	E(T)	CRUISE 323			STATION 009			INTERPOLATED AND COMPUTED VALUES						VAR RATIO
				SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEO POT ANOMALY	POT ENERGY	OXY ML/L	E(O)					
0		12.36	0.00													
10		11.42	0.00	32.644	0.000	24.71	323.8	0.000	0.00	6.83	0.00					
20		11.15	0.00	32.634	0.000	24.88	308.2	0.032	0.02	6.72	0.00					
30		10.53	0.00	32.640	0.000	24.93	303.3	0.063	0.06	6.65	0.00					
				32.670	0.000	25.07	290.9	0.093	0.14	6.51	0.00					
50		10.32	0.01	32.637	0.003	25.08	290.3	0.152	0.38	6.37	0.01			1.00		
75		10.23	0.02	32.648	0.004	25.10	288.5	0.225	0.85	6.19	0.01			0.94		
100		8.23	0.01	33.102	0.001	25.77	224.9	0.289	1.42	5.09	0.00			0.94		
150		6.88	0.02	33.543	0.006	26.31	174.2	0.390	2.68	4.76	0.02			0.89		
200		6.92	0.01	33.983	0.058	26.65	142.8	0.470	4.09	3.72	0.01			6.83		
250		6.72	0.17	34.080	0.079	26.75	133.7	0.539	5.70	3.71	0.21			67.71		

BROWN BEAR CRUISE 323 STATION 010 OBSERVED VALUES

DATE 17/05/63 HR 03.7 LAT 45-27 N LONG 129-02 W SMDG 2743 WEA 02 WIND VEL 14 DIR 30
 BAROM 28.0 TEMP DRY 11.0 WET 8.8 RELHU 75 WTRCLR SEA 2 DIR 30 SWELL 0 DIR 00
 CLOUD TYPE 3 AMT 2 VIS WIRE ANGLE(S) 15

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	ADU	SATN	PHOS	NITR	SIL
1	0	11.63	32.596	24.81	6.94	0.620	-0.083	116	0.64	0.2	2
1	5	11.65	32.595	24.81	6.88	0.614	-0.078	115	0.63	0.2	2
1	10	11.23	32.586	24.88	6.75	0.603	-0.062	111	0.60	0.2	2
1	19	10.94	32.589	24.93	6.70	0.598	-0.054	110	0.65	0.4	2
1	29	10.09	32.569	25.06	6.70	0.598	-0.043	108	0.73	1.2	4
1	38	9.97	32.567	25.08	6.46	0.577	-0.020	104	0.78	1.6	5
1	48	9.96	32.570	25.08	6.35	0.567	-0.010	102	0.79	2.0	4
1	73	9.90	32.598	25.12	6.22	0.556	-0.002	100	0.93	2.8	5
1	97	8.16	33.296	25.93	4.50	0.402	0.175	70	1.70	20.0	26
1	121	8.24	33.602	26.16	3.70	0.330	0.244	57	1.64	19.2	24
1	145	8.01	33.803	26.35	2.96	0.264	0.313	46	2.28	28.7	39
1	169	7.71	33.888	26.46	2.73	0.244	0.337	42	2.23	16.8	26
1	193	7.45	33.943	26.55	2.54	0.227	0.357	39	2.27	27.8	41
1	290	6.55	34.008	26.72	1.89	0.169	0.428	28	2.56	34.5	55

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BROWN BEAR CRUISE 323 STATION 010 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY	SAL
0	0.23	0.35	32.598
8	0.22	0.28	32.596
36	0.15	0.17	32.588
53	0.25	0.15	32.576
100	0.08	0.03	33.240
10.44	11.45	-	WATER COLUMN VALUES

MESSANGER TIME 2010 INCOMING SOLAR RADIATION - AM 349 PM 380

DEPTH	BROWN BEAR		CRUISE 323		STATION 010		INTERPOLATED AND COMPUTED VALUES						VAR RATIO
	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)			
0	11.63	0.00	32.596	0.000	24.81	314.4	0.000	0.00	6.94	0.00			
10	11.23	0.00	32.586	0.000	24.88	308.5	0.032	0.02	6.75	0.00			
20	10.85	0.02	32.587	0.001	24.95	302.2	0.063	0.06	6.70	0.01	0.88		
30	10.06	0.01	32.568	0.000	25.07	290.8	0.092	0.14	6.68	0.01	0.85		
50	9.99	0.02	32.559	0.008	25.07	290.8	0.151	0.38	6.37	0.02	1.00		
75	9.75	0.04	32.651	0.013	25.18	280.7	0.223	0.84	6.09	0.03	0.88		
100	8.13	0.04	33.348	0.005	25.98	205.1	0.284	1.38	4.37	0.02	0.84		
150	7.95	0.00	33.827	0.002	26.38	167.8	0.378	2.56	2.89	0.01	0.76		
200	7.38	0.00	33.954	0.001	26.56	151.2	0.459	4.00	2.49	0.00	10.86		
250	6.92	0.01	33.996	0.005	26.66	142.6	0.533	5.70	2.17	0.01	67.81		

BROWN BEAR CRUISE 323 STATION 011 OBSERVED VALUES

DATE 17/05/63 HR 07-2 LAT 45-30 N LONG 128-37 W SNG 2743 WEA 03 WIND VEL 17 DIR 02
 BAROM 27.0 TEMP DRY 10.4 WET 8.6 RELHU 79 WTRCLR SECDI SEA 3 DIR 02 SWELL 1 DIR 28
 CLOUD TYPE VIS WIRE ANGLE(S) 16

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
1	0	11.06	32.531	24.87	6.78	0.606	-0.062	111	0.66	1.5	3
1	5	11.11	32.527	24.85	7.06	0.631	-0.088	116	0.69	2.0	3
1	10	11.06	32.525	24.86	6.85	0.612	-0.068	113	0.68	2.1	3
1	19	10.52	32.532	24.96	7.09	0.633	-0.083	115	0.70	2.4	4
1	28	10.10	32.529	25.03	7.55	0.674	-0.119	121	0.65	2.1	3
1	36	9.86	32.525	25.07	7.04	0.629	-0.071	113	0.68	2.3	4
1	44	9.77	32.523	25.08	6.59	0.589	-0.029	105	0.82	2.6	5
1	69	9.76	32.528	25.09	6.44	0.575	-0.016	103	0.84	2.9	5
1	93	8.37	33.000	25.67	5.73	0.512	0.064	89	1.43	14.7	18
1	116	7.66	33.310	26.02	4.68	0.418	0.166	72	1.69	18.8	27
1	139	7.76	33.592	26.23	5.05	0.451	0.130	78	1.65	21.8	30
1	164	7.67	33.746	26.36	4.61	0.412	0.170	71	1.87	24.0	34
1	187	7.47	33.889	26.50	3.34	0.298	0.286	51	1.87	27.6	41
1	284	6.40	33.963	26.70	2.92	0.261	0.338	44	2.32	33.5	52

BROWN BEAR CRUISE 323 STATION 011 BIOLOGICAL DATA

INCOMING SOLAR RADIATION - AM 413 PM 396

ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0006-0021 DEPTHS 100, 70, 30, 0

BROWN BEAR				CRUISE 323				STATION 011				INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO					
0	11.06	0.00	32.531	0.000	24.87	309.4	0.000	0.00	6.79	0.00						
10	11.06	0.00	32.525	0.000	24.86	313.1	0.032	0.02	6.85	0.00						
20	10.47	0.00	32.532	0.000	24.97	299.9	0.062	0.06	7.16	0.02	0.85					
30	10.03	0.00	32.528	0.000	25.04	293.3	0.092	0.14	7.46	0.03	0.71					
50	9.82	0.06	32.501	0.015	25.05	292.4	0.151	0.38	6.49	0.08	1.12					
75	9.44	0.06	32.632	0.019	25.22	277.3	0.223	0.84	6.31	0.01	0.72					
100	8.08	0.01	33.103	0.004	25.80	222.6	0.286	1.40	5.35	0.06	0.69					
150	7.74	0.00	33.669	0.007	26.29	176.6	0.387	2.66	4.97	0.00	0.67					
200	7.32	0.01	33.961	0.004	26.58	149.9	0.469	4.12	3.43	0.40	16.97					
250	6.71	0.04	34.012	0.015	26.70	138.5	0.542	5.79	2.74	0.39	61.14					

BROWN BEAR CRUISE 323 STATION 012 OBSERVED VALUES

DATE 17/05/63 HR 13.1 LAT 45-36 N LONG 128-06 W SNDC 2743 WEA 02 WIND VEL 19 DIR 00
 BAROM 21.0 TEMP DRY 10.4 WET 8.9 RELHU 82 WTRCLR SEA 3 DIR 22 SWELL 1 DIR 36
 CLOUD TYPE 0 AMT 2 VIS WIRE ANGLE(S) 14

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN		PHOS	NITR	SIL
					ML/L	MGA/L			
1	0	11.04	32.548	24.88	6.59	0.589	0.64	0.9	2
1	5	11.08	32.548	24.88	6.53	0.583	0.64	0.8	2
1	10	11.09	32.549	24.87	6.52	0.582	0.67	0.9	2
1	19	11.00	32.547	24.89	6.53	0.583	0.66	0.9	2
1	29	10.26	32.521	25.00	6.56	0.586	0.65	1.1	2
1	38	10.22	32.525	25.01	6.53	0.583	0.59	1.7	3
1	47	10.13	32.539	25.03	6.16	0.550	0.72	1.7	4
1	71	9.45	32.821	25.36	5.69	0.508	1.13	9.8	12
1	95	8.38	33.307	25.91	4.55	0.406	1.70	21.5	25
1	143	7.97	33.818	26.37	3.00	0.268	2.11	30.9	38
1	167	7.87	33.889	26.44	2.87	0.322	2.26	28.9	39
1	190	7.36	33.958	26.57	2.59	0.231	2.26	32.1	44
1	288	6.36	34.020	26.75	1.94	0.173	2.46	37.4	60

BROWN BEAR CRUISE 323 STATION 012 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.12	0.26	2.38	32.547
8	0.11	0.33	2.28	32.547
36	0.12	0.27	0.12	32.547
53	0.23	0.28	0.12	32.531
100	0.04	0.07		33.203

7.03 14.84 54.28 - WATER COLUMN VALUES

MESSENGER TIME 0437 INCOMING SOLAR RADIATION - AM 413 PM 396

BROWN BEAR			CRUISE 323		STATION 012		INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEO POT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	11.04	0.00	32.548	0.000	24.88	307.8	0.000	0.00	6.59	0.00	
10	11.09	0.00	32.549	0.000	24.87	308.8	0.032	0.02	6.52	0.00	
20	10.92	0.02	32.544	0.001	24.90	306.6	0.063	0.06	6.53	0.00	0.88
30	10.24	0.01	32.521	0.000	25.00	297.3	0.093	0.14	6.57	0.00	0.85
50	10.07	0.00	32.559	0.003	25.06	292.1	0.152	0.39	6.10	0.03	1.02
75	9.27	0.02	32.900	0.008	25.46	254.7	0.221	0.82	5.51	0.02	0.80
100	8.28	0.03	33.386	0.002	25.93	204.4	0.279	1.33	4.33	0.01	0.95
150	7.96	0.02	33.845	0.004	26.33	166.6	0.373	2.51	2.95	0.02	0.64
200	7.07	0.03	33.986	0.001	26.63	144.7	0.451	3.91	2.45	0.01	14.12
250	6.77	0.16	34.030	0.007	26.71	138.0	0.522	5.55	2.18	0.06	1.24

BROWN BEAR CRUISE 323 STATION 013 OBSERVED VALUES

DATE 17/05/63 HR 16.6 LAT 45-40 N LONG 127-38 W SNRG 2789 WEA 02 WIND VEL 17 DIR 01
 BAROM 23.0 TEMP DRY 11.6 WET 10.4 RELHU 87 WTRCLR SEA 3 DIR 01 SWELL 3 DIR 03
 CLOUD TYPE 4 AMT 1 VIS 8 WIRE ANGLE(S) 9, 7, 7

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	—	—	OXYGEN	—	—	PHOS	NITR	SIL
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BROWN BEAR CRUISE 323 STATION 013 BIOLOGICAL DATA										
DEPTH	CHL-A	PRODUCTIVITY LAB-1	DECK-1	LIGHT PRCD	SAT FILT	IRRAD	SAL	PHCS	NITR	SIL
0	0.13	0.21	1.22			50	32.561	0.70	0.8	2
10	0.09	0.27	1.42			10	32.561	0.66	0.9	1
31	0.24	0.41	0.52				32.570	0.67	0.9	1
74	0.12	0.26	0.38	0.29	100	1	32.560	0.69	0.7	2

12.54 23.82 53.14 - WATER COLUMN VALUES

MESSANGER TIME 1145 INCOMING SOLAR RADIATION - AM 413 PM 396

LIGHT SATURATION INCUBATOR ILLUMINATION 18800

DEPTH	BROWN BEAR	TEMP	E(1)	SAL	E(1)	SIGMA-T	INTERPOLATED AND COMPUTED VALUES					
							SP VOL ANOMALY	GEO POT ANOMALY	POT ENERGY	OXY ML/L	E(0)	VAR RATIO
0		11.19	0.00	32.561	0.000	24.87	309.4	0.000	0.00	6.85	0.00	
10		11.20	0.00	32.560	0.000	24.88	310.9	0.032	0.02	6.85	0.00	
20		11.16	0.00	32.574	0.000	24.88	308.3	0.053	0.06	6.65	0.00	
30		10.79	0.00	32.559	0.000	24.94	302.7	0.094	0.14	6.64	0.00	
50		10.18	0.03	32.539	0.013	25.02	298.3	0.157	0.39	6.11	0.07	1.09
75		9.82	0.01	32.555	0.009	25.17	296.1	0.227	0.85	5.72	0.02	1.094
100		9.44	0.01	32.478	0.003	26.04	199.3	0.357	1.39	5.86	0.01	0.94
150		7.67	0.00	32.838	0.000	26.40	105.3	0.579	2.55	2.95	0.00	0.89
200		7.38	0.00	32.954	0.001	26.57	151.0	0.59	3.97	2.35	0.01	1.05
250		6.87	0.02	32.987	0.006	26.66	142.3	0.533	5.68	2.05	0.07	1.29
300		6.32	0.00	34.004	0.000	26.74	112.3	0.734	7.65	1.93	0.00	0.77
400		5.62	0.02	34.057	0.000	26.88			12.31	1.36	0.04	
500		5.08	0.00	34.115	0.000	26.99	113.4	0.853	17.81	0.85	0.00	0.97
600		4.66	0.02	34.162	0.003	27.09	104.5	0.963	24.02	0.58	0.02	0.80
700		4.34	0.01	34.249	0.002	27.18	96.7	1.065	30.79	0.42	0.01	0.80
800		4.07	0.01	34.312	0.000	27.25	89.9	1.159	38.05	0.35	0.01	0.73
1000		3.61	0.00	34.413	0.001	27.38	78.7	1.330	53.73	0.35	0.00	0.98
1200		3.14	0.02	34.476	0.005	27.48	69.9	1.480	70.68	0.54	0.04	0.91
1500		2.52	0.00	34.532	0.000	27.58	60.5	1.678	98.05	0.91	0.00	13.11

BROWN BEAR CRUISE 323 STATION 014 OBSERVED VALUES													
DATE 17/05/63				HR 23.1				LAT 45-45 N				LONG 127-10 W	
BAPOM 19.0				TEMP DPT 13.2				WET 12.1				RELHU 88	
CLOUD TYPE 0				AMT 2				VIS 8				WIRE ANGLE(S) 30	
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	ADU	SATN	PHQS	NIR	SIL	
1	0	11.30	32.550	24.85	6.54	0.584	-0.044	108	0.64	0.7	2	2	
1	4	11.33	32.570	24.85	6.53	0.583	-0.043	108	0.66	0.8	2	2	
1	7	11.28	32.561	24.85	6.51	0.581	-0.041	108	0.69	1.1	3	3	
1	16	11.14	32.562	24.88	6.48	0.579	-0.036	107	0.68	0.9	3	3	
1	24	11.01	32.570	24.91	6.50	0.581	-0.037	107	0.64	0.9	3	3	
1	31	10.87	32.580	24.94	6.51	0.581	-0.036	107	0.67	0.9	3	3	
1	39	10.07	32.554	25.05	6.52	0.582	-0.021	104	0.69	1.1	4	4	
1	58	8.80	33.349	25.88	6.45	0.576	-0.021	104	0.77	1.8	5	5	
1	79	8.33	33.853	26.43	3.88	0.347	0.222	61	1.81	21.5	29	29	
1	98	8.19	33.896	26.43	2.39	0.213	0.359	37	2.03	21.1	31	31	
1	118	8.11	33.924	26.43	2.37	0.212	0.363	37	2.11	22.3	34	34	
1	139	8.07	33.931	26.45	2.31	0.206	0.369	36	2.42	32.7	44	44	
1	160	7.58	33.968	26.55	2.15	0.192	0.384	33	2.48	32.2	45	45	
1	245				1.84	0.164	0.418	28	2.72	35.2			

BROWN BEAR CRUISE 323 STATION 014 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY	SAL
	LAB-I	DECK-I	
0	0.20	0.40	32.565
10	0.14	0.45	32.565
31	0.17	0.35	32.566
74	0.42	0.15	32.597
100	0.13	0.05	33.778

17.83 27.28 - WATER COLUMN VALUES

MESSANGER TIME 1525 INCOMING SOLAR RADIATION - AM 413 PM 396

BROWN BEAR			CRUISE 323			STATION 014			INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(Y)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO		
0	11.30	0.00	32.560	0.000	24.85	311.4	0.000	0.00	6.54	0.00			
10	11.23	0.00	32.559	0.001	24.86	310.5	0.032	0.02	6.49	0.00	1.09		
20	11.08	0.00	32.565	0.000	24.89	307.6	0.063	0.06	6.49	0.00	0.65		
30	10.89	0.00	32.579	0.001	24.93	303.6	0.094	0.14	6.51	0.00	0.81		
50	10.38	0.02	32.508	0.024	24.97	300.8	0.155	0.39	6.62	0.08	1.09		
75	9.03	0.03	33.175	0.028	25.71	230.8	0.222	0.81	4.43	0.09	0.79		
100	8.31	0.00	33.869	0.007	26.36	169.0	0.272	1.25	2.35	0.02	0.87		
150	8.09	0.00	33.929	0.001	26.44	162.3	0.355	2.32	2.23	0.01	0.58		
200	7.98	0.02	33.958	0.007	26.48	159.3	0.436	3.78	2.01	0.05	66.26		

BROWN BEAR										OBSERVED VALUES				
DATE 18/05/63			HR 02.4			LAT 45-49 N			LONG 126-42 W			STNG 2835		
BAROM 17.0			TEMP DRY 12.3			WET 11.1			RELHU 87			SEA 2 DIR 36		
CLOUD TYPE 0			AMT 2			VIS 7			WIRE ANGLE(S) 10			SWELL 1 DIR 36		
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL		
1	0	11.41	32.586	24.85	6.37	0.569	-0.030	106	0.64	0.6	0.6	1		
1	5	11.46	32.591	24.84	6.50	0.581	-0.042	108	0.66	0.6	0.6	1		
1	10	11.41	32.595	24.85	6.45	0.576	-0.037	107	0.66	0.7	0.7	2		
1	20	11.14	32.595	24.90	6.51	0.581	-0.035	107	0.65	0.8	0.8	1		
1	29	10.30	32.581	25.04	6.52	0.582	-0.030	105	0.72	1.7	1.7	2		
1	38	10.22	32.579	25.05	6.47	0.578	-0.024	104	0.75			2		
1	48	10.20	32.594	25.06	6.42	0.573	-0.020	104	0.75	2.0	2.0	2		
1	72	8.82	33.272	25.82	4.36	0.389	0.179	68	1.73	20.0	20.0	25		
1	96	8.35	33.612	26.15	3.34	0.298	0.275	52	2.09	26.5	26.5	33		
1	119	8.10	33.809	26.35	2.89	0.258	0.318	45	2.24	29.8	29.8	39		
1	143	7.88	33.867	26.42	2.58	0.230	0.348	40	2.35	31.8	31.8	42		
1	167	7.64	33.917	26.50	2.42	0.216	0.366	37	2.39	33.0	33.0	44		
1	191	7.45	33.973	26.57	2.24	0.200	0.384	34	2.46	34.4	34.4	46		
1	289	6.52	34.012	26.73	1.97	0.176	0.421	29	2.62	36.3	36.3	54		

BROWN BEAR CRUISE 323 STATION 015 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.19	0.33		32.591
10	0.18	0.42		32.594
31	0.36	0.44		32.594
74	0.31	0.36		32.598

21.88 28.50 - WATER COLUMN VALUES

MESSANGER TIME 1845 INCOMING SOLAR RADIATION - AM 413 PM 396

BROWN BEAR			CRUISE 323			STATION 015			INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO		
0	11.41	0.00	32.588	0.000	24.85	311.2	0.000	0.00	6.37	0.00			
10	11.41	0.00	32.595	0.000	24.85	310.8	0.032	0.02	6.45	0.00			
20	11.14	0.00	32.595	0.000	24.90	306.5	0.063	0.06	6.51	0.00			
30	10.27	0.01	32.580	0.000	25.04	293.4	0.093	0.14	6.52	0.00	0.86		
50	10.10	0.04	32.640	0.016	25.12	286.6	0.152	0.38	6.28	0.05	0.99		
75	8.73	0.01	33.327	0.004	25.87	215.0	0.215	0.77	4.19	0.01	0.84		
100	8.30	0.00	33.656	0.000	26.20	184.7	0.265	1.22	3.24	0.01	0.78		
150	7.81	0.00	33.882	0.000	26.45	161.8	0.352	2.33	2.53	0.01	0.70		
200	7.39	0.00	33.993	0.001	26.59	148.4	0.431	3.72	2.17	0.00	13.08		
250	6.99	0.02	34.022	0.007	26.67	141.6	0.504	5.41	2.02	0.02	69.06		

BROWN BEAR CRUISE 323 STATION 016 OBSERVED VALUES
 DATE 18/05/63 HR 06.2 LAT 45-54 N LONG 126-15 W SNOG 2651 WEA 02 WIND VEL 9 DIR 36
 BAROM 15.0 TEMP DRY 12.7 WET 11.5 RELHU 88 WTRCLR SEA 2 DIR 36 SWELL 1 DIR 01
 CLOUD TYPE VIS 8 WIRE ANGLE(S) 1

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
1	0	11.41	32.497	24.78	6.44	0.575	-0.036		107	0.61	0.2	3
1	5	11.49	32.497	24.76	6.76	0.604	-0.065		112	0.64	0.2	3
1	10	11.50	32.479	24.75	6.70	0.598	-0.060		111	0.61	0.3	3
1	20	11.26	32.489	24.80	6.54	0.584	-0.043		108	0.59	0.2	3
1	30	10.38	32.543	24.99	6.52	0.582	-0.031		106	0.69	1.0	3
1	39	10.17	32.540	25.03	6.51	0.581	-0.027		105	0.73	1.3	4
1	49	10.11	32.542	25.04	6.45	0.576	-0.021		104	0.73	1.5	4
1	74	9.97	32.552	25.07	6.33	0.565	-0.009		102	0.76	1.7	4
1	99	9.09	33.124	25.66	4.70	0.420	0.146		74	1.55	16.1	18
1	123	7.37	33.406	26.13	4.76	0.425	0.162		72	1.56	20.6	28
1	148	7.37	33.700	26.37	3.96	0.354	0.233		60	2.07	24.0	33
1	173	7.15	33.812	26.48	3.88	0.347	0.242		59	1.90	22.0	32
1	197	6.96	33.900	26.58	3.40	0.304	0.288		51	2.17	29.0	41
1	296	5.80	33.957	26.78	2.37	0.212	0.396		35	2.46	30.6	51

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BROWN BEAR CRUISE 323 STATION 016 BIOLOGICAL DATA
 DEPTH CHL-A PRODUCTIVITY LAB-I DECK-I SAL

0	0.27	0.63	32.504
10	0.30	0.43	32.511
31	0.32	0.29	32.539
74	0.33	0.14	32.556
100	0.06	0.03	33.271

23.44 22.54 - WATER COLUMN VALUES

MESSENGER TIME 2225 INCOMING SOLAR RADIATION - AM 413 PM 396

DEPTH	BROWN BEAR		CRUISE 322	STATION 016		INTERPOLATED AND COMPUTED VALUES					
	TEMP	ELT)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	EID)	VAR RATIO
0	11.41	0.00	32.497	0.000	24.78	317.0	0.000	0.00	6.44	0.00	
10	11.50	0.00	32.479	0.000	24.75	321.0	0.033	0.02	6.70	0.00	
20	11.26	0.00	32.489	0.000	24.80	316.3	0.065	0.07	6.54	0.00	
30	10.38	0.00	32.543	0.000	24.99	297.9	0.092	0.15	6.52	0.00	
50	10.11	0.00	32.537	0.004	25.03	294.4	0.155	0.39	6.46	0.01	1.00
75	9.95	0.00	32.572	0.005	25.09	289.7	0.229	0.86	6.26	0.02	0.94
100	9.01	0.02	33.138	0.002	25.68	233.6	0.295	1.44	4.69	0.02	0.94
150	7.36	0.00	33.713	0.002	26.38	168.0	0.396	2.70	3.95	0.01	0.89
200	6.94	0.00	33.909	0.000	26.59	148.5	0.476	4.12	3.32	0.01	6.83
250	6.48	0.02	33.987	0.003	26.71	137.4	0.548	5.78	2.91	0.16	67.71

BROWN BEAR CRUISE 323 STATION 017 OBSERVED VALUES										
DATE 18/05/63	HR 09.2	LAT 45-58 N	LONG 125-48 W	SDNG 2377	WEA 00	WIND VEL 3	DIR 36	SEA 1	DIR 36	
BAROM 13.0	TEMP DRY 13.2	WET 11.9	RELHU 87	WTRCLR	SECDI	SWELL 1	DIR 49			
CLOUD TYPE	AMT 0	VIS 8	WIRE ANGLE(S)	8						
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN MGA/L	AOU	PHOS	NITR	SIL
1	0	11.53	32.332	24.63	6.90	0.616	-0.078	0.54	0.9	4
1	5	11.60	32.327	24.61	6.68	0.597	-0.059	0.61	0.0	4
1	10	11.62	32.326	24.61	6.78	0.606	-0.068	0.64	0.0	4
1	20	11.28	32.324	24.67	6.60	0.589	-0.048	0.57	0.0	4
1	30	10.07	32.335	24.88	6.82	0.609	-0.053	0.67	0.2	5
1	39	9.71	32.492	25.07	5.96	0.532	0.028	0.98	5.4	9
1	48	9.43	32.604	25.20	5.71	0.510	0.053	1.10	7.4	10
1	73	8.49	33.181	25.80	4.80	0.429	0.145	1.63	17.7	21
1	97	8.04	33.503	26.11	3.85	0.344	0.234	1.97	26.4	31
1	120	8.17	33.723	26.27	3.51	0.313	0.262	2.17	28.0	35
1	145	8.01	33.893	26.42	2.84	0.254	0.323	2.36	31.7	40
1	169	7.53	33.947	26.54	2.51	0.224	0.359	2.31	26.8	35
1	193	7.28	33.971	26.59	2.44	0.218	0.369	2.55	33.1	45
1	290	6.12	34.020	26.79	1.92	0.171	0.431	2.55	30.0	48

BROWN BEAR CRUISE 323 STATION 017 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.15	0.22		32.327
10	0.15	0.38		32.324
31	0.28	0.32		32.317
74	0.02	0.00		33.277
100	0.03	0.00		33.522

12.41 17.55 - WATER COLUMN VALUES

MESSANGER TIME 0138 INCOMING SOLAR RADIATION - AM 323 PM 314

ZOOPLANKTON (CLARKE-BUMPUS) HORIZ - TIME 0215-0230 DEPTHS 100, 70
0245-0300 35, 0

BROWN BEAR			CRUISE 323			STATION 017			INTERPOLATED AND COMPUTED VALUES			
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO	
0	11.53	0.00	32.332	0.000	24.63	332.1	0.000	0.00	6.90	0.00		
10	11.62	0.00	32.326	0.000	24.61	334.4	0.034	0.02	6.78	0.00		
20	11.28	0.00	32.324	0.000	24.67	328.9	0.067	0.07	6.60	0.00		
30	10.07	0.00	32.335	0.000	24.88	308.3	0.100	0.15	6.82	0.00		
50	9.55	0.01	32.648	0.008	25.24	274.3	0.158	0.39	5.64	0.00	1.02	
75	8.43	0.00	33.214	0.002	25.83	219.0	0.220	0.78	4.71	0.01	0.88	
100	8.05	0.02	33.536	0.000	26.14	190.0	0.272	1.24	3.80	0.02	0.83	
150	7.91	0.02	33.910	0.002	26.45	161.2	0.360	2.35	2.75	0.00	0.75	
200	7.23	0.01	33.974	0.001	26.60	147.7	0.438	3.74	2.30	0.08	10.86	
250	6.90	0.09	33.981	0.009	26.65	143.4	0.512	5.44	2.05	0.09	67.81	

BROWN BEAR CRUISE 323 STATION 17A BIOLOGICAL DATA

DATE 18/05/63 LAT 46-00 N LONG 125-34 W

DEPTH CHL-A PRODUCTIVITY
LAB-I DECK-I SAL

0 0.22 0.54 5.56 32.374

MESSENGER TIME 0420 INCOMING SOLAR RADIATION - AM 323 PM 314

BROWN BEAR CRUISE 323 STATION 018 OBSERVED VALUES

DATE 18/05/63 HR 13.8 LAT 46-02 N LONG 125-20 W SNRG 1536 WEA 02 WIND VEL 3 DIR 36
BAROM 14.0 TEMP DRY 14.4 WET 13.2 RELHU 87 WTRCLR SECDI SEA 1 DIR 36 SWELL 2 DIR 36
CLOUD TYPE 0 AMT 1 VIS 7 WIRE ANGLE(S) 0

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL
1	0	11.77	32.369	24.61	6.45	0.576	-0.040	108	108	0.64	0.2	2
1	5	11.79	32.456	24.68	6.44	0.575	-0.040	108	108	0.61	0.2	2
1	10	11.79	32.471	24.69	6.52	0.582	-0.047	109	109	0.69	0.1	2
1	20	11.52	32.479	24.74	6.46	0.577	-0.039	107	107	0.64	0.1	2
1	30	10.48	32.396	24.86	6.74	0.602	-0.051	109	109	0.72	0.2	3
1	39	10.08	32.418	24.95	6.64	0.593	-0.037	107	107	0.75	0.9	5
1	49	9.89	32.427	24.99	6.37	0.569	-0.011	102	102	0.93	2.1	7
1	74	9.24	32.713	25.31	5.48	0.489	0.076	87	87	1.28	10.6	13
1	99	8.34	33.212	25.84	4.52	0.404	0.171	70	70	1.77	20.4	25
1	123	8.10	33.555	26.15	3.67	0.328	0.249	57	57	2.24	29.9	39
1	148	7.62	33.799	26.41	3.09	0.276	0.307	47	47	2.35	32.5	41
1	173	7.42	33.877	26.50	2.86	0.255	0.329	44	44	2.47	33.4	46
1	197	7.29	33.941	26.57	2.50	0.223	0.363	38	38	2.77	38.0	60
1	296	6.15	33.995	26.76	1.82	0.163	0.440	27	27			

BROWN BEAR CRUISE 323 STATION 018 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.14	0.58		32.268
10	0.11	0.50		32.423
31	0.28	0.60		32.397
74	0.17	0.12		33.399
100	0.06	0.02		33.179

14.92 32.33 - WATER COLUMN VALUES

MESSANGER TIME 0612 INCOMING SOLAR RADIATION - AM 323 PM 314

BROWN BEAR			CRUISE 323			STATION 018			INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO		
0	11.77	0.00	32.369	0.000	24.61	333.6	0.000	0.00	6.45	0.00			
10	11.79	0.00	32.471	0.000	24.69	326.6	0.034	0.02	6.52	0.00			
20	11.52	0.00	32.479	0.000	24.74	321.5	0.066	0.07	6.46	0.00			
30	10.48	0.00	32.396	0.000	24.86	310.4	0.098	0.15	6.74	0.00			
50	9.87	0.00	32.433	0.001	24.99	298.2	0.160	0.40	6.34	0.00	1.00		
75	9.20	0.01	32.732	0.002	25.23	266.1	0.231	0.85	5.44	0.00	0.94		
100	8.33	0.01	33.229	0.000	25.85	216.8	0.291	1.39	4.48	0.00	0.94		
150	7.60	0.00	33.809	0.002	26.42	164.2	0.387	2.59	3.07	0.01	0.89		
200	7.28	0.00	33.948	0.000	26.57	150.2	0.467	4.00	2.45	0.00	6.83		
250	6.93	0.04	34.007	0.003	26.67	141.9	0.540	5.70	2.08	0.07	67.71		

BROWN BEAR CRUISE 323 STATION 019 OBSERVED VALUES														
DATE 18/05/63		HR 20.3	LAT 45-59 N	LONG 124-44 W	SECDI 432	SEA 3	DIR 16	WIND VEL 10	DIR 16					
BAROM 17.0		TEMP DRY 14.6	WET 13.4	RELHU 87	WTRCLR 6									
CLOUD TYPE		AMT 0	VIS 6	WIRE ANGLE(S) 6										
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MG/L	OXYGEN	AOU	SATN	PHOS	NITR	SIL		
1	0	14.16	21.454	15.77	7.34	0.656	-0.108		120	0.21	0.2	65		
1	5	11.41	32.367	24.68	6.83	0.610	-0.070		113	0.51	0.2	2		
1	10	11.01	32.432	24.80	6.76	0.604	-0.059		111	0.59	0.2	1		
1	20	10.64	32.424	24.86	6.69	0.598	-0.049		109	0.47	1.1	2		
1	29	10.19	32.398	24.91	6.69	0.598	-0.043		108	0.60	0.9	3		
1	38	10.25	32.459	24.95	6.50	0.581	-0.027		105	0.59	1.1	3		
1	48	10.03	32.483	25.01	6.28	0.561	-0.005		101	0.75	2.9	5		
1	73	9.09	32.827	25.43	5.41	0.483	0.084		85	1.14	12.4	15		
1	97	8.08	33.270	25.93	4.52	0.404	0.175		70	1.56	21.6	26		
1	120	8.00	33.601	26.20	3.77	0.337	0.241		58	1.79	26.5	34		
1	145	7.96	33.851	26.40	2.88	0.257	0.320		45	1.99	30.6	40		
1	169	7.79	33.917	26.48	2.67	0.238	0.341		41	2.06	30.2	39		
1	192	7.29	33.967	26.59	2.50	0.223	0.363		38	2.18	29.4	44		
1	290	6.06	34.022	26.79	1.70	0.152	0.452		25	2.56	38.0	64		

BROWN BEAR CRUISE 323 STATION 019 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	CRUISE 323	STATION 019	LIGHT PROD	SAT FILT	IRRAD	SAL	PHOS	NITR	SIL
0	1-28	3-58	18-92		1-39	100		21-484	0-46	1-0	55
					1-21	66					
					1-07	50					
					0-90	35					
					0-45	16					
					0-09	5					
2	1-32	2-71	18-60				50	21-497	0-42	0-2	55
6	0-98	2-69	2-90				10	31-430	0-58	0-3	6
32	0-31	0-20	0-00				1	32-437	0-61	0-4	2
200	0-00							33-948	2-46	33-3	43

23-84 39-66 118-22 - WATER COLUMN VALUES

MESSANGER TIME 1140 INCOMING SOLAR RADIATION - AM 323 PM 314

LIGHT SATURATION INCUBATOR ILLUMINATION 20000

BROWN BEAR			CRUISE 323			STATION 019			INTERPOLATED AND COMPUTED VALUES				
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEUPOT ANOMALY	POT ENERGY	OXY ML/L	E(C)	VAR RATIO		
0	14-16	0-00	21-454	0-000	15-77	1183-4	0-000	0-00	7-34	0-00			
10	11-01	0-00	32-432	0-000	24-80	316-1	0-076	0-02	6-76	0-00			
20	10-64	0-00	32-424	0-000	24-86	310-7	0-108	0-07	6-69	0-00			
30	10-19	0-01	32-404	0-002	24-92	305-1	0-138	0-14	6-67	0-00	0-86		
50	9-97	0-01	32-501	0-004	25-03	294-7	0-199	0-39	6-22	0-00	1-00		
75	8-99	0-01	32-864	0-003	25-47	253-2	0-268	0-83	5-33	0-00	0-88		
100	8-04	0-02	33-319	0-000	25-97	206-1	0-326	1-34	4-42	0-00	0-83		
150	7-94	0-01	33-872	0-004	26-42	164-4	0-419	2-51	2-81	0-02	0-75		
200	7-08	0-02	33-981	0-000	26-63	145-0	0-497	3-90	2-44	0-00	11-77		
250	6-59	0-14	34-030	0-000	26-73	135-7	0-568	5-53	2-09	0-02	72-99		

BROWN BEAR CRUISE 323 STATION 020 OBSERVED VALUES
 DATE 18/05/63 HR 22.3 LAT 46-10 N LONG 124-36 W SNDC 165 WEA 10 WIND VEL 12 DIR 15
 BAROM 17.0 TEMP DRY 14.7 WET 13.8 RELHU 90 WTRCLR 5 SEA DIR 15 SWELL 1 DI 15
 CLOUD TYPE VIS 8 WIRE ANGLE(S) 5
 CST DEPTH TEMP SAL SIGMA-T ML/L MGA/L OXYGEN - - - - - PHOS NITR SIL
 1 13.88 25.509 18.93 6.61 0.590 -0.054 110 0.38 0.6 32
 1 12.86 28.317 21.28 6.52 0.582 -0.045 108 0.38 0.1 16
 1 12.05 30.122 22.82 6.69 0.598 -0.057 111 0.48 0.1 12
 1 10.42 32.084 24.63 6.51 0.581 -0.029 105 0.58 0.1 6
 1 10.25 32.237 24.78 6.22 0.556 -0.001 100 0.73 2.1 8
 1 10.11 32.351 24.89 5.98 0.534 0.022 96 0.84 4.6 9
 1 9.87 32.610 25.13 5.57 0.497 0.060 89 0.69 5.3 15
 1 8.99 33.247 25.77 4.04 0.361 0.206 64 1.75 21.6 29
 1 8.30 33.529 26.10 3.93 0.351 0.223 61 1.83 22.0 26
 1 7.82 33.713 26.31 3.34 0.298 0.282 51 1.91 29.0 36
 1 7.43 33.932 26.54 2.45 0.219 0.366 37 2.20 27.0 40

BROWN BEAR CRUISE 323 STATION 020 BIOLOGICAL DATA
 DEPTH CHL-A PRODUCTIVITY LAB-I DECK-I SAL
 0 0.43 1.09 25.137
 2 0.57 1.02 27.492
 6 0.53 1.00 28.688
 32 0.84 0.84 32.258
 100 0.02 33.575
 10.14 30.02 - WATER COLUMN VALUES
 MESSENGER TIME 1436 INCOMING SOLAR RADIATION - AM 323 PM 314

BROWN BEAR			CRUISE 323			STATION 020			INTERPOLATED AND COMPUTED VALUES						
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEO POT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO				
0	13.88	0.00	25.509	0.000	18.93	877.9	0.000	0.00	6.61	0.00					
10	12.05	0.00	30.122	0.000	22.82	504.5	0.070	0.03	6.69	0.00					
20	10.42	0.00	32.084	0.000	24.63	332.3	0.112	0.09	6.51	0.00					
30	10.25	0.00	32.237	0.000	24.78	318.4	0.145	0.17	6.22	0.00					
50	9.84	0.00	32.640	0.003	25.16	282.4	0.206	0.42	5.50	0.01	1.00				
75	8.93	0.00	33.278	0.004	25.80	221.5	0.269	0.81	4.01	0.02	0.89				
100	8.25	0.00	33.545	0.002	26.12	192.3	0.321	1.28	3.90	0.00	0.88				

BROWN BEAR			CRUISE 323			STATION 021			OBSERVED VALUES						
DATE	19/05/63	HR	00.7	LAT	46-13 N	LONG	124-19 W	SNDG	110	WEA-02	WIND VEL	9	DIR	18	
BAROM	18.0	TEMP	DRY	15.6	WET	14.0	RELHU	84	WTRCLR	SEA	2	DIR	18	SWELL	1
CLOUD	TYPE	8	AMT	6	VIS	7	WIRE	ANGLE(S)	3						09
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	AOU	SATN	PHOS	NITR	SIL				
1	0	13.87	25.722	19.10	6.57	0.587	-0.051	110	0.57	1.0	36				
1	5	13.67	27.029	20.14	6.57	0.587	-0.054	110	0.48	0.4	29				
1	10	12.03	29.985	22.72	6.71	0.599	-0.058	111	0.48	0.1	7				
1	20	10.57	31.400	24.07	6.45	0.576	-0.023	104	0.50	0.1	4				
1	30	10.18	31.882	24.51	6.06	0.541	0.015	97	0.72	1.6	8				
1	39	10.12	32.158	24.74	6.19	0.553	0.003	99	0.73	1.9	8				
1	49	9.69	32.491	25.07	5.56	0.497	0.064	89	1.00	9.0	13				
1	74	8.32	33.534	26.10	4.31	0.385	0.189	67	2.13	27.3	40				

BROWN BEAR			CRUISE 323			STATION 021			INTERPOLATED AND COMPUTED VALUES					
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO			
0	13.87	0.00	25.722	0.000	19.10	862.0	0.000	0.00	6.57	0.00				
10	12.03	0.00	29.985	0.000	22.72	514.3	0.070	0.03	6.71	0.00				
20	10.57	0.00	31.400	0.000	24.07	385.3	0.115	0.09	6.45	0.00				
30	10.18	0.00	31.882	0.000	24.51	343.6	0.152	0.19	6.06	0.00				
50	9.63	0.00	32.526	0.000	25.10	287.6	0.215	0.44	5.47	0.01	7.33			

BROWN BEAR CRUISE 323 STATION 022 OBSERVED VALUES

COLUMBIA RIVER ENTRANCE

DATE 19/05/63 HR 02.0 LAT 46-15 N LONG 124-11 W SNDC 27 WEA 03 WIND VEL 16 DIR 23
 BAROM 18.0 TEMP DRY 14.4 WET 13.6 RELHU 91 WTRCLR SEC DI SEA 2 DIR 23 SWELL DIR
 CLOUD TYPE 8 AMT 8 VIS 7 WIRE ANGLE(S) 7

CST	DEPTH	TEMP	SAL	SIGMA-T	OXYGEN		PHOS	NITR	SIL
					ML/L	AOU			
1	0	12.26	15.113	11.22	6.85	0.612	0.019	103	0.90
1	5	11.74	28.644	21.74	6.57	0.587	-0.037	107	0.62
1	10	11.06	31.537	24.09	6.06	0.541	0.006	99	0.81
1	20	9.96	32.302	24.88	5.07	0.453	0.105	81	1.26

BROWN BEAR CRUISE 323 STATION 022 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	1.62	1.57		11.732
1	2.34	2.63		21.926
3	2.42	3.47		27.645
7	3.24	5.61		30.949
27	0.66	0.85		32.906

18.05 26.06 - WATER COLUMN VALUES

MESSENGER TIME 1815 INCOMING SOLAR RADIATION - AM 323 PM 314

DEPTH	TEMP	E(T)	BROWN BEAR CRUISE 323 STATION 022				INTERPOLATED AND COMPUTED VALUES				VAR RATIO
			SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	
0	12.26	0.00	15.113	0.000	11.22	1626.4	0.000	0.00	6.85	0.00	
10	11.06	0.00	31.537	0.000	24.09	383.1	0.102	0.02	6.06	0.00	
20	9.96	0.00	32.302	0.000	24.88	308.8	0.137	0.07	5.07	0.00	

BROWN BEAR CRUISE 323 STATION 023 OBSERVED VALUES
 NORTH HEAD
 DATE 19/05/63 HR 03.7 LAT 46-21 N LONG 124-11 W SNG 27 WEA 03 WIND VEL 7 DIR 23
 BAROM 18.0 TEMP DRY 15.4 WET 14.0 RELHU 85 WTRCLR SECDI 27 SEA 1 DIR 23 SWELL 1 DIR 23
 CLOUD TYPE 8 AMT 8 VIS 6 WIRE ANGLE(S) 17
 CST DEPTH TEMP SAL SIGMA-T ML/L OXYGEN MGA/L AOU SATN PHOS NITR SIL
 1 0 13.27 18.437 13.61 6.93 0.619 -0.051 109 0.80 3.5 42
 1 5 13.02 28.810 21.63 6.74 0.602 -0.068 113 0.45 0.1 6
 1 10 12.66 29.379 22.14 6.72 0.600 -0.064 112 0.44 0.1 4
 1 14 11.55 30.536 23.23 6.68 0.597 -0.052 109 0.56 0.1 4
 1 19 10.45 31.646 24.28 6.31 0.564 -0.009 102 0.58 0.4 2

BROWN BEAR CRUISE 323 STATION 023 INTERPOLATED AND COMPUTED VALUES
 DEPTH TEMP E(T) SAL E(S) SIGMA-T SP VOL ANOMALY GEOPOT ANOMALY POT ENERGY OXY ML/L E(O) VAR RATIO
 0 13.27 0.00 18.437 0.000 13.61 1392.8 0.000 0.00 6.53 0.00
 10 12.66 0.00 29.379 0.000 22.14 570.1 0.099 0.03 6.72 0.00

OYSTERVILLE

DATE 19/05/63 HR 05.0 LAT 46-33 N LCNG 124-13 W
BAROM 18.0 TEMP DRY 14.0 WET 12.8 RELHU 92 WTRCLR
CLOUD TYPE 5 AMT 8 VIS 5 WIRE ANGLE(S) 0, 0
SDNG 38 WEA 03 WIND VEL 7 DIR 20
SECDI SEA 2 DIR 20 SWELL 1 DIR 20

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	- - -	MGA/L	OXYGEN	- - -	SATN	PHOS	NITR	SIL
1	0	13.37	29.482	22.08	6.52	0.582	-0.054	110	0.45	0.1	10		
1	5	13.45	29.492	22.07	6.48	0.579	-0.052	110	0.46	0.1	10		
2	10	11.93	30.658	23.26	6.48	0.579	-0.039	107	0.71	0.8	10		
1	15	11.02	31.290	23.91	6.61	0.590	-0.042	108	0.56	0.3	5		
1	20	10.57	31.515	24.16	6.40	0.572	-0.018	103	0.52	0.1	5		
1	25	10.20	31.834	24.47	6.28	0.561	-0.004	101	0.61	0.8	4		
1	30	9.84	32.350	24.93	5.45	0.487	0.072	87	1.07	6.2	14		

BROWN BEAR CRUISE 323 STATION 024 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	1.03	1.22		29.479
1	0.94	1.33		29.485
3	0.95	1.04		29.483
7	1.45	1.85		30.352
28	0.82	1.21		32.794

7.68 9.43 - WATER COLUMN VALUES

MESSANGER TIME 2110 INCOMING SOLAR RADIATION - AM 323 PM 314

BROWN BEAR		CRUISE 323		STATION 024		INTERPOLATED AND COMPUTED VALUES					
DEPTH	TEMP	E(T)	SAL	EIS	SIGMA-T	SP VOL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.37	0.00	29.482	0.000	22.08	575.3	0.000	0.00	6.52	0.00	
10	11.93	0.00	30.658	0.000	23.26	462.8	0.053	0.02	6.48	0.00	
20	10.57	0.00	31.515	0.000	24.16	376.8	0.095	0.09	6.40	0.00	
30	9.84	0.00	32.350	0.000	24.93	303.5	0.129	0.17	5.45	0.00	

BROWN BEAR CRUISE 323 STATION 025 OBSERVED VALUES												
DATE 19/05/63		HR 09.2		LAT 46-32 N		LNG 124-52 W		SNDG 1079		WEA 02		
BAROM 21.0		TEMP DRY 14.0		WET 12.6		RELHU 87		SEA 1		DIR 32		
CLOUD TYPE 7		AMT 8		VIS 7		WIRE ANGLES 2		WTRCLR		SWELL 1		
CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	ADU	SATN	PHOS	NITR	SIL
1	0	13.71	28.037	20.90	6.30	0.568	-0.039	107	107	0.45	0.0	20
1	5	12.40	29.534	22.30	6.61	0.590	-0.052	110	110	0.51	0.0	15
1	10	11.36	31.857	24.20	6.73	0.501	-0.059	111	111	0.57	0.0	7
1	20	10.58	32.261	24.74	6.80	0.607	-0.057	110	110	0.66	0.0	7
1	30	10.19	32.285	24.82	6.76	0.604	-0.049	109	109	0.66	0.0	7
1	39	9.94	32.375	24.94	6.40	0.577	-0.019	103	103	0.75	2.1	7
1	48	9.63	32.492	25.08	6.17	0.551	0.010	98	98	0.96	5.6	9
1	73	8.89	32.910	25.52	5.21	0.465	0.104	82	82	1.43	14.7	18
1	98	8.52	33.451	26.00	3.80	0.339	0.232	59	59	1.96	25.8	25
1	121	8.11	33.734	26.29	2.79	0.249	0.327	43	43	2.30	31.1	40
1	140	7.74	33.869	26.45	2.67	0.238	0.342	41	41	2.30	31.7	42
1	170	7.57	33.928	26.52	2.44	0.218	0.365	37	37	2.36	33.8	44
1	194	7.21	33.944	26.58	2.46	0.220	0.368	37	37	2.41	34.2	47
1	292	6.07	33.998	26.77	1.97	0.176	0.428	29	29	2.58	38.3	58

BROWN BEAR			CRUISE 323			STATION 025			INTERPOLATED AND COMPUTED VALUES						
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEOPOT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO				
0	13.71	0.00	28.037	0.000	20.90	688.1	0.000	0.00	6.36	0.00					
10	11.36	0.00	31.857	0.000	24.29	364.5	0.054	0.02	6.73	0.00					
20	10.58	0.00	32.261	0.000	24.74	321.8	0.088	0.07	6.80	0.00					
30	10.19	0.00	32.285	0.000	24.82	313.9	0.120	0.15	6.76	0.00					
50	9.56	0.00	32.521	0.000	25.11	286.9	0.181	0.40	6.11	0.00	1.02				
75	8.86	0.01	32.955	0.004	25.56	244.4	0.248	0.82	5.10	0.01	0.89				
100	8.48	0.00	33.483	0.001	26.03	200.3	0.304	1.32	3.69	0.01	0.88				
150	7.71	0.01	33.883	0.001	26.46	160.3	0.394	2.46	2.63	0.01	0.79				
200	7.10	0.01	33.964	0.011	26.61	146.6	0.472	3.84	2.34	0.08	9.88				
250	6.25	0.08	33.997	0.013	26.75	133.6	0.542	5.47	2.15	0.10	70.50				

BROWN BEAR CRUISE 323 STATION 026 OBSERVED VALUES

DATE 19/05/63 HR 11.6 LAT 46-24 N LONG 124-32 W SNOG 143 WEA 02 WIND VEL 10 DIR 32
 BAROM 19.0 TEMP DRY 13.4 WET 12.7 RELHU 92 WTRCLR SECDI SEA 1 DIR 32 SWELL 1 DIR 49
 CLOUD TYPE 7 AMT 9 VIS 7 WIRE ANGLE(S) 2

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	MGA/L	OXYGEN	ADU	SATN	PHOS	NITR	SIL
1	0	13.21	29.454	22.09	6.47	0.578	-0.048	109	0.40	0.2	0.2	14
1	5	13.24	29.468	22.10	6.54	0.584	-0.055	110	0.42	0.1	0.1	7
1	10	11.66	30.211	22.96	6.72	0.600	-0.055	110	0.44	0.4	0.4	4
1	20	10.74	31.221	23.91	6.55	0.585	-0.033	106	0.46	0.2	0.2	2
1	30	10.53	31.435	24.11	6.35	0.567	-0.013	102	0.54	0.8	0.8	5
1	39	10.30	31.808	24.44	6.19	0.553	-0.002	100	0.65	1.0	1.0	8
1	48	10.17	32.068	24.66	6.19	0.553	0.003	99	0.72	1.2	1.2	10
1	73	9.15	32.906	25.48	4.75	0.424	0.141	75	1.40	15.1	15.1	22
1	98	8.59	33.434	25.98	3.68	0.329	0.242	58	1.98	24.1	24.1	32
1	122	8.88	33.774	26.20	2.80	0.250	0.316	44	2.16	27.6	27.6	43

BROWN BEAR CRUISE 323 STATION 026 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY LAB-I	DECK-I	SAL
0	0.25	0.41		29.453
2	0.34	0.45		29.456
6	0.20	0.57		29.469
32	0.85	0.18		31.494
100	0.08	0.00		33.574
15.25		16.54	- WATER COLUMN VALUES	
MESSENGER TIME 0354				

BROWN BEAR CRUISE 323 STATION 026				INTERPOLATED AND COMPUTED VALUES							
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VOL ANOMALY	GEO POT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.21	0.00	29.454	0.000	22.09	574.4	0.000	0.00	6.47	0.00	
10	11.66	0.00	30.211	0.000	22.96	491.2	0.054	0.03	6.72	0.00	
20	10.74	0.00	31.221	0.000	23.91	401.4	0.099	0.09	6.55	0.00	
30	10.53	0.00	31.435	0.000	24.11	382.3	0.139	0.19	6.35	0.00	
50	10.10	0.02	32.138	0.006	24.73	323.7	0.210	0.48	6.11	0.03	1.02
75	9.08	0.01	32.957	0.002	25.53	247.7	0.282	0.93	4.65	0.00	0.89
100	8.65	0.04	33.467	0.001	25.99	203.9	0.339	1.43	3.60	0.00	5.21

BROWN BEAR CRUISE 323 STATION 027 OBSERVED VALUES

DATE 19/05/63 HR 13.8 LAT 46-18 N LONG 124-18 W SNGD 82 WEA 02 WIND VEL 7 DIR 30
 BAROM TEMP DRY 13.1 WET 12.2 REL HU 91 WTR CLR SEA 1 DIR 30 SWELL 1 DIR 30
 CLOUD TYPE 8 AMT 9 VIS 5 WIRE ANGLE(S) 14

CST	DEPTH	TEMP	SAL	SIGMA-T	ML/L	OXYGEN	ACU	SATN	PHOS	NITR	SIL
1	0	13.07	21.846	17.03	6.60	0.589	-0.035	106	0.57	2.1	55
1	5	13.34	28.266	19.61	6.66	0.595	-0.055	110	0.57	0.8	30
1	10	13.20	28.902	21.67	6.73	0.601	-0.069	113	0.50	0.0	11
1	20	10.94	31.166	23.83	6.76	0.604	-0.054	110	0.40	0.4	4
1	30	10.22	31.931	24.54	6.06	0.541	0.015	97	0.80	1.9	8
1	39	9.86	32.302	24.89	5.59	0.499	0.060	89	1.04	6.8	12
1	49	9.23	32.862	25.43	4.74	0.423	0.141	75	1.61	16.9	21
1	59	8.96	33.110	25.67	4.28	0.382	0.185	67	1.82	21.0	27
1	69	8.36	33.541	26.10	2.87	0.256	0.317	45	2.39	28.5	43

BROWN BEAR CRUISE 323 STATION 027 BIOLOGICAL DATA

DEPTH	CHL-A	PRODUCTIVITY	LAB-I	DECK-I	SAL
0	1.90	2.88			20.733
1	0.82	2.67			22.766
3	1.35	2.83			24.812
7	0.78	2.11			28.124
70	0.27	0.57			33.464

7.83 18.17 = WATER COLUMN VALUES

MESSENGER TIME 0600

BROWN BEAR		CRUISE 323		STATION 027		INTERPOLATED AND COMPUTED VALUES					
DEPTH	TEMP	E(T)	SAL	E(S)	SIGMA-T	SP VCL ANOMALY	GEOPT ANOMALY	POT ENERGY	OXY ML/L	E(O)	VAR RATIO
0	13.07	0.00	22.846	0.000	17.03	1060.9	0.000	0.00	6.60	0.00	
10	13.20	0.00	28.902	0.000	21.67	615.1	0.085	0.03	6.73	0.00	
20	10.94	0.00	31.166	0.000	23.83	408.7	0.136	0.11	6.76	0.00	
30	10.22	0.00	31.931	0.000	24.54	340.6	0.174	0.20	6.06	0.00	
50	9.20	0.01	32.890	0.007	25.46	254.1	0.234	0.44	4.71	0.02	0.87

Unclassified

Security Classification

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13 ABSTRACT <p>This report contains tabulated physical, chemical, and biological data collected during cruises 322 and 323 of the Research Vessel <u>Brown Bear</u> and biological data collected during Cruise 1 of the chartered fishing vessel <u>Betty A</u> during the months of April - May 1963 in an area within 255 miles of the coasts of Washington and Oregon. These data were collected as part of a year-round study which has as its objective the determination of the gross features of the movement and dispersion of Columbia River effluent water in the northeast Pacific.</p>		

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14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Oceanographic data Physical oceanographic data Chemical oceanographic data Biological oceanographic data Oceanographic cruises Research Vessel <u>Brown Bear</u> Fishing Vessel <u>Betty A</u> Northeast Pacific Ocean Washington - Oregon coast Columbia River Effluent water						

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